THE IRON TRADE REVIEW

VOLUME XXXIV. CLEVELAND, O., NOVEMBER 21, 1901. NUMBER 47

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

A buoyant iron market on the eve of the quiet time of year is an anomaly, but there are growing signs of a condition under which the market might readily cut loose. In the past week pig iron has advanced, though important producers have steadily opposed an advance and throughout the trade there has been a feeling that the limit had been reached. It is truth to say that the course of the market in the past three months has been a general surprise and has contradicted the predictions of all the trade oracles. Leading Southern interests were quoted only a few weeks ago, after a 50-cent advance in foundry iron, as strongly opposing any further increase in price, but in the week under review prices have moved up 50 cents, and $11.50, Birmingham, is now the minimum for No. 2 foundry. Bessemer iron, which has been relatively higher than foundry grades, in line with conditions in steel has moved up still higher, and sales have been made in the past week at $15.50, Valley furnace. The purchase of Bessemer iron on three-months' contracts by the United States Steel Corporation is now under consideration, and the demand on merchant Bessemer furnaces from other sources may lead to this change from the policy of buying month by month. The pig iron statement for Nov. 1, showing a reduction of 88,000 tons in October, coincident with an increase in output, was a surprise. It is now evident that with the banking of Central Western furnaces for lack of coke the stock reduction in November will be even greater. In the Valleys and the Pittsburg district furnaces are taking their turn in waiting for coke and there will be alternating banking and starting for some weeks. It is estimated that 50,000 tons of Bessemer has been sold to various consumers in the week, as high as $15.70 at Valley furnace having been paid; in addition 25,000 tons of basic iron from an Eastern furnace was bought at $15.75, delivered, Pittsburg. For the first time since 1899 Virginia iron has been shipped into Northern Ohio, on a basis of about $13 at the furnace for No. 2. In the week some contracts for Connellsville furnace coke for the first half of 1902 have been made at $2 at the oven, as against $1.75 for outside coke. The steel situation grows no better and it is a serious question with some buyers of billets, sheet bars and slabs whether they can secure a sufficient supply for the operation of their plants in the next six months. It is believed that the United States Steel Corporation now has very little steel to offer for delivery in the first half of 1902. With the exception of bars and plates the situation at all finishing mills is one of congestion which in structural material in particular is increasing. The Uganda Railroad contract for 20 bridges goes to the American Bridge Co. and calls for 12,000 tons. Other structural orders from Chicago, Cleveland and the East have come in upon the mills in the week, and it is estimated that fully 125,000 tons of shapes have been booked for next year. A meeting of the structural steel manufacturers will probably be held next month and there is some talk of an advance. Plate mill outputs would be larger but for the fact that structural mills cannot deliver shapes that should accompany the plates. While no Pittsburg mills would consider the proposal for consolidation four Eastern mills have been secured by interests close to the United States Steel Corporation, as detailed elsewhere, and their incorporation in a large company will come in due time. The effort to secure an agreement on wire nail prices has not succeeded as yet.

Nothing has come thus far of the negotiations between the Republic Iron & Steel Co. and the Tennessee company for the former's supply of forge iron for next year. In any event a large block of iron is to be bought for Valley mills.

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
429 PARK BUILDING, Nov 20.

Additional large sales of both Bessemer and basic iron, shipments running into the first quarter of next year, have been made during the week. While the United States Steel Corporation has not yet made purchases of Bessemer iron for the first quarter of next year, part of its requirements of basic iron for the months of January, February and March have been provided for, 25,000 tons having been purchased for this delivery from an Eastern furnace at $15.75, Pittsburg. The question of buying Bessemer iron for the first quarter of next year is still before the pig iron committee of the corporation and it is probable that the tonnage for this period will be purchased within a few days. The Valley furnacemen are now urging more strongly than ever the purchase of Bessemer by the Steel Corporation for three months at a time, owing to the fact that outside interests will soon be in the market for large tonnages and from present indications will pay more than $15.25 at Valley furnace. Several steel producers east of Pittsburg purchased round lots of Bessemer iron in the week amounting to nearly 50,000 tons, for delivery within the next three and four months. This iron brought $15.50 at the furnace and it is probable that the United States Steel Corporation will be compelled to pay this same price for next year's delivery.

Small lots of Bessemer, one of 500 tons, were sold during the week at $16.45, Pittsburg, for delivery within the next four or five weeks. Forge and foundry iron for delivery this year are also commanding fancy prices, one 1,000-ton lot of forge having been sold at $15, Pittsburg, while small lots of No. 2 foundry iron are bringing as high as $15.75 and $15.85.

The Southern producers have also advanced the price of forge and foundry iron 50 cents a ton during the week, making forge iron for delivery in 1902 $14.65 per ton at Pittsburg, and No. 2 foundry $15.65 per ton. With this advance comes the announcement that the working agreement among the Southern producers has been adjusted and all the furnaces are strictly adhering to one price.

The consolidation of Eastern plate manufacturers was perfected last week and includes the Lukens Iron & Steel Co., and Worth Bros., at Coatesville, Pa., the Central Iron & Steel Co. at Harrisburg and the Tidewater Steel Co. The price paid for these plants approximates $25,000,000, the purchasers being parties affiliated with the United States Steel Corporation. For the present the plants will continue to operate as

heretofore, but it is probable that in the near future they will be consolidated with other large iron and steel interests.

In finished lines structural material continues to lead, and contracting by structural concerns all over the country for delivery next year goes on steadily. It is now estimated that the structural mills of the country have on their books 125,000 tons for delivery next year. The American Bridge Co. closed several large contracts during the past week, the largest of which calls for 20 steel bridges for shipment to East Africa. The contract was placed by the Uganda Railroad and calls for about 12,000 tons of material. English and Continental concerns also bid on the work. No meeting of the structural manufacturers has yet been called, but it is probable that one will be held shortly, when the price of structural material will no doubt be advanced.

The car shortage is still preventing the proper movement of coke from the Connellsville region, and it is stated on excellent authority that one of the largest shippers in the region is short 300 cars daily. The banking of furnaces for from one to two days continues both in this district and in the Mahoning and Shenango Valleys. The blast furnaces in these districts are also experiencing considerable difficulty in securing cars for the shipment of pig iron and many foundries and steel plants are operating on only scant supplies of iron. Several foundries in this district were compelled to shut down for a day or two during the week owing to the delay in shipments.

The price of foundry and furnace coke for delivery the first half of next year has been practically established, a number of large contracts for furnace coke having been closed during the week at $2 per ton. Outside coke for the same delivery is held at $1.75 per ton. Foundry coke for next year's delivery is held at $2.35 to $2.50 for Connellsville, while outside coke is quoted at $2.10 to $2.25.

PIG IRON.—Sales of Bessemer iron for delivery the next three and four months have been made during the week amounting to nearly 50,000 tons, the sales having been made on a basis of $16.25, Pittsburg. The United States Steel Corporation purchased 25,000 tons of basic iron from an Eastern producer for shipment during the first three months of next year at $15.75 per ton, Pittsburg. We note the sale of 3,500 tons of forge iron for delivery the first quarter next year at $14.50 per ton, although sales for delivery the remainder of this year have been made as high as $15 per ton. We also note the sale of a number of small lots of No. 2 foundry iron for delivery this month and December at prices ranging from $15.50 to $15.85. We revise quotations as follows:

Bessemer, Valley	$15 25 to 15 70
Bessemer, Pittsburg	16 00 to 16 45
No. 1 Foundry	15 75 to 16 25
No. 2 Foundry	15 50 to 15 85
No. 3 Foundry	15 00 to 15 25
Gray Forge, Pittsburg	14 50 to 15 00
Chilled Basic, Valley	15 00 to 15 25
Chilled Basic, Pittsburg	15 75 to 16 00

STEEL.—Thus far there has been practically no buying of Bessemer billets for delivery next year, and it is believed the Steel Corporation will have few to offer. Domestic billets continue scarce and command $28 to $28.25 per ton. Further negotiations are now on for the importation of several thousand tons of German billets, which can be delivered in Pittsburg at $28 per ton. The lot of billets and sheet bars now on the ocean from Germany only amounts to a few hundred tons. Sheet bars are selling at $31 per ton for prompt shipment, while tin bars are offered at $31.50. Steel rods are quoted at $33 per ton.

FERRO-MANGANESE.—Domestic manganese, 80 per cent, is quoted at $53.50 per ton, delivered at buyer's mill in carload lots, while foreign manganese is quoted at $50 per ton.

SPELTER.—The spelter market continues to rule strong and we quote prime Western grades at 4.25c, Pittsburg.

MUCK BAR.—We note the sale of several hundred tons of all pig muck at $30 per ton. Other grades are offered at $29.50 to $29.75.

SKELP.—A fair demand for iron and steel skelp has set in and grooved and sheared iron skelp is quoted at 1.85c, while steel skelp is quoted at 1.75c.

RAILS AND TRACK MATERIAL.—The Edgar Thomson mill of the Carnegie Steel Co. is filled up with orders that will occupy it into the fourth quarter of 1902. The entire order placed by the Pennsylvania Railroad Co. with the United States Steel Corporation will be rolled at this mill owing to the fact that the rails at this plant are finished by the Kennedy-Morrison process. Our quotations are as follows: Standard sections, 50 pounds and over, in lots of 200 tons and over, $28; car lots and less than 200 tons, $30; less than car lots, $32; light rails, 8 pounds, $42; 12 pounds, $38; 16 pounds, $35; 20 pounds, $34; 25 to 40 pounds, $32. Track material: Spikes, 1.95c to 2c; track bolts, square heads, 2.40c; hexagon heads, 2.55c; fish plates, 1.50c to 1.60c.

PLATES.—Announcement has been made that the plants of the Tidewater Steel Co., Lukens Iron & Steel Co., Worth Bros. and the Central Iron & Steel Co. have been purchased by interests intimately affiliated with the United States Steel Corporation. This absorption will further centralize the plate business of the country so that in the future there will be only four interests in the plate agreement. Prompt deliveries can be made on nearly all kinds of plates, although the market is reported in better condition than for some time. Quotations are unchanged as follows: Tank plate, ¼-inch thick and up to 100 inches in width, 1.60c at mill, Pittsburg; flange and boiler steel, 1.70c; marine, ordinary firebox, A. B. M. A. specifications, 1.80c; still bottom steel, 1.80c; locomotive firebox, not less than 2.10c; and it ranges in price to 3c. Plates more than 100 inches wide, 5 cents extra 100 pounds. Plates 3-16 of an inch in thickness, $1 extra; gauges Nos. 7 and 8, $3 extra; No. 9, $5 extra. These quotations are based on carload lots, with 5 cents extra a hundred pounds for less than carload lots. Terms, net cash in 30 days.

BARS.—While the mills are all in full operation not much new business is being placed in iron and steel bars. We make the following quotations: Common iron bars, 1.50c, Pittsburg, for Western delivery and 1.55c, Pittsburg, for Eastern delivery; refined iron bars, 1.75c and upwards: Bessemer steel bars, 1.50c; open-hearth, 1.60c; plow beams and cultivator beams, 1.50c, net; channels, angles, zees and tees, Bessemer, under three inches, 1.60c: over 3 inches, 1.70c. Hoops and bands are quoted at 1.90c, full extras.

PIPES AND TUBES.—Demand for merchant pipe is reported much better this month than during the same period last year and the indications point to an exceedingly strong market for the winter months. On certain lines independent manufacturers are cutting prices in order to secure business. Discounts to consumers in carload lots, Pittsburg, are as follows:

MERCHANT PIPE.

	Blk. Per cent.	Galvd. Per cent.
⅛ to ¾ and 11 to 12 inches	61	48
⅞ to 10 inches	68½	56

BOILER TUBES.

Steel.

	Per cent.
1 to 1¾ inches	47½
2¼ to 5 inches	65½
1¾ to 2¼ and 6 to 13 inches	60

Iron.

	Per cent.
1 to 1½ and 2½ inches	43½
1¾ to 2¼ inches	43
2¾ to 13 inches	53

CASING.

	S. and S. Per cent.
2 to 3 inches	58
3½ to 4 inches	63
4½ to 12¾ inches	65

SHEETS.—Deliveries on sheets are not much better than they have been during the past two months and the big amount of new business that is being closed by both the combine and independent manufacturers has resulted in putting all the mills behind on their deliveries. The following quotations to the trade are made by American Sheet Steel Co. distributers: Blue annealed sheets, Nos. 10, 11 and 12, 2.40c; Nos. 14 and 15, 2.50c; Nos. 16 and 17, 2.60c. One pass through cold rolls: Nos. 18, 19, 20 and 21, 2.50c; Nos. 22, 23 and 24, 2.80c; Nos. 25 and 26, 2.90c; No. 27, 3c; No. 28, 3.10c; No. 29, 3.25c; No. 30, 3.35c. On lots less than 500 bundles the American Sheet Steel Co. does not make shipments except through jobbers. Galvanized sheets are quoted at 70 and 10 off; galvanized sheets for spot shipment, at 70 off. Prices to jobbers are somewhat lower than the above.

STRUCTURAL MATERIAL.—The demand for structural material for delivery next year continues very strong and contracts placed during the week amount to about 10,000 tons. The American Bridge Co. closed a big contract during the week for steel bridges for erection in Africa amounting to about 12,000 tons. We make the following quotations: Beams

and channels, 3 to 15 inches, 1.60c; 18 to 24 inches, 1.70c; tees, 1.65c; zees, 1.60c; angles, from 3 to 6 inches, 1.60c; universal mill plates, 1.60c.

WIRE AND WIRE NAILS.—Efforts to form an agreement among the manufacturers of wire nails have not proved successful as yet, although steps in that direction are still being taken: Sales of nails have been made during the week at $2.12 per keg. We revise quotations as follows: Single carloads of wire nails to jobbers at $2.12 to $2.15 and less than carload lots at $2.25 to $2.30; plain wire, carload lots, is quoted at $2.20 to $2.25 to jobbers and $2.30 to $2.35 to retailers; painted barb wire, $2.60 in carload lots to jobbers, and $2.70 to retailers; galvanized barb wire, $2.85 to $2.90 in carload lots to jobbers, and $3 to retailers. Cut nails are quoted at $2.05, Pittsburg, in carload lots, and $2.10 to $2.15 in less than carload lots, 2 per cent off in 10 days.

MERCHANT STEEL.—While the majority of sales of shafting are being made at 52½ and 55 off, a number have been reported as low as 57½ and 60 off. The shafting agreement has not yet been revived and the indications are that it will not be. We make the following quotations: Turned, cold rolled and ground shafting 57½ to 60 per cent off for car lots and 52½ to 55 per cent off for less than car lots; tire steel in carload lots and over, 1.60c; less than carload lots, 1.75c to 1.80c. Toe calk is sold at 1.70c, in large lots, and in small lots as high as 1.85c. Tool steel is held at 7c and upwards, according to quantity.

OLD MATERIAL.—Nothing has come of the effort of the large dealers in old material to form an agreement for establishing uniform prices, owing to the refusal of a number of dealers to entertain the proposition. The market, however, is fairly strong. Our quotations, gross tons, are as follows: Heavy melting stock, $16.50 to $17; low phosphorus melting stock, $18 to $18.50; steel rails, $17 to $17.25; bushelling scrap, $13 to $14; No. 1 wrought, $17 to $17.25; iron rails, $21 to $21.25; cast borings, $8.25 to $8.50; cast scrap, $14 to $14.25.

COKE.—A number of contracts for furnace coke for delivery next year were made during the week at $2 per ton for Connellsville and $1.75 per ton for outside coke. Foundry coke, Connellsville for next year's delivery, is held at $2.35 to $2.50 per ton, and outside coke is held at $2.10 to $2.25. For the week ending Saturday, Nov. 9, the estimated production of the Connellsville region amounted to 236,376 tons, an increase over the output of the previous week of nearly 3,000 tons. The shipments for the week amounted to 10,273 cars. Shipments from the Masontown coke fields during the first two weeks this month amounted to about 600 cars.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
534 MONADNOCK BLOCK, Nov. 19.

No relief is yet in sight from the car famine, which is curtailing both production and consumption of iron and steel products in this territory. Mills which had been rapidly catching up on delinquent deliveries, caused by the steel strike in the summer, report that the scarcity of cars is throwing them behind again. With this embargo removed, the condition of the trade could not possibly be better. There has been active buying of pig iron during the past week, 1,000-ton and 500-ton sales being quite plentiful. As reported in our last issue, Tennessee brands of Southern iron were advanced on the 15th 50 cents a ton and Virginia irons 75 cents a ton. Southern gray forge has been advanced $1 a ton, making the present price $14.15 to $14.40. The greater proportion of the business taken during the past week has gone to Southern furnaces, these being in better position to guarantee satisfactory delivery than Northern sellers, though on certain grades Southern furnaces are sold up to March and April of next year. The bar iron market still remains quiet, transactions in the main being for small lots. Probably the largest order of the week was taken by an Indiana mill from a car-builder, being for 2,000 tons, delivery to be made in the next six weeks. It is quite probable that there will be another heavy buying movement in bar iron during the latter part of December and in January, many inquiries being reported in the market for delivery of material commencing with the first of the year. The structural steel situation remains unchanged. The Chicago, Rock Island & Pacific Railroad let contracts last week for the erection of its depot, which will require about 4,000 tons of steel. In all other finished products, there has been active buying, though deliveries are slow, owing to the scarcity of cars. Scrap iron is growing weaker, and it is predicted there will be a fall in prices in the near future. The committee appointed at the Cincinnati meeting of scrap iron dealers was in Chicago last week conferring with the local mill owners, with a view to regulating the prices of scrap iron.

PIG IRON.—As indicated in our last report, prices of Southern iron were increased on the 15th 50 cents and 75 cents a ton. Gray forge iron, for which there has been a heavy demand and on which some Southern furnaces are sold up until next March and April, was advanced $1.00 a ton. Transactions have been active during the past week, 1,000-ton and 500-ton sales being quite plentiful. Most of the business taken has gone to Southern furnaces, these being in position to give better delivery than Northern furnaces. We revise our prices as follows:

Lake Sup. Charcoal	$17 50 to $18 00	Southern Coke No. 4	$14 15 to $14 40
Local Coke Fdy. No. 1	15 50 to 16 00	Southern No. 1 Soft	15 15 to 15 90
Local Coke Fdy. No. 2	15 00 to 15 50	Southern No. 2 Soft	14 65 to 15 40
Local Coke Fdy. No. 3	14 50 to 15 00	Southern Gray Forge	14 15 to 14 40
Local Scotch Fdy. No. 1	15 50 to 16 00	Southern Silveries	15 65 to 17 50
Local Scotch Fdy. No. 2	15 00 to 15 50	Jackson Co. Silveries	17 00 to 17 50
Local Scotch Fdy. No. 3	14 50 to 15 00	Ohio Strong Softeners	16 50 to 17 00
Southern Coke No. 1	15 90 to 16 15	Alabama Car Wheel	20 50 to 21 00
Southern Coke No. 2	15 15 to 15 40	Malleable Bessemer	15 50 to 16 00
Southern Coke No. 3	14 65 to 14 90	Coke Bessemer	17 50 to 18 50

BAR IRON.—Manufacturers report a quiet market, though many inquiries are being received which would indicate another buying movement in the near future. Most of the transactions have been for small lots, with the exception of a contract received by an Indiana mill for 2,000 tons. We quote iron and steel bars at 1.65c, out of store, 2c.

SHEETS.—Mills continue to report a good business, though the car famine is materially affecting shipments. We quote No. 27 black, 3.75c to 3.90c, and galvanized 65 per cent and 10 per cent to 70 per cent from store.

BILLETS.—Small-sized orders are occasionally taken by local mills more to oblige a customer than with the desire to sell. We quote Bessemer billets, $31 to $33, and open-hearth, $33 to $35.

STRUCTURAL STEEL.—The Rock Island Railroad let contracts last week for the erection of its new depot, which will require about 4,000 tons of steel shapes. It is also reported that contracts have been let for a building to be erected by Joseph T. Ryerson & Son, requiring about 900 tons of steel. Current demand is excellent, and mills continue several weeks behind in delivery of material. We quote mill shipments, carloads lots, as follows: Beams, 15 inches and under, 1.70c; 18 inches and over, 1.85c; angles, 1.75c to 1.80c; plates, 1.75c, base; tees, 1.80c; zees, 1.75c; small lots from store, ¼c higher; beams and channels from store, ½c to ¾c per pound higher.

RAILS AND TRACK SUPPLIES.—Large contracts for rails continue to be placed by Western roads, and the local interest reports that its capacity is taken for about ten months of next year. If the present demand keeps up, the capacity of all the mills in the country will soon be contracted for. There is an active demand for track supplies, and sales of light rails are also satisfactory. We quote as follows: Standard rails, $28; light sections, $34 to $36, according to size; out of store, $40 to $44; splice bars, 1.60c to 1.70c; spikes, 1.90c to 2c; out of store, 2c; track bolts, nexagon nuts, 2.80c to 2.90c; out of store, 2.90c to 3c; square nuts, base, 2.65c to 2.75c; out of store, 2.75c to 2.85c.

MERCHANT STEEL.—So confident are implement manufacturers, carriage builders, and others of an indefinite continuance of present trade conditions, that contracts are now being placed for shipment of material in the second quarter of next year, though these come entirely unsolicited by the mills. Prices remain firm. Our quotations for mill shipments, Chicago delivery, follow: Smooth finished tire steel, 1.90c to 2c; open-hearth spring steel, 2.50c to 2.75c; toe calk, 2.40c to 2.60c; sleigh shoe, 1.85c to 1.90c; cutter shoe, 2.40c to 2.60c; ordinary tool steel, 6c to 7c; specials, 13c and upwards. Cold-rolled shafting, carload lots, 55 per cent; less than carload lots, 50 per cent.

PLATES.—Though the buying is not active, the local interest reports that it receives orders sufficient to keep mills about two weeks behind order books. A large contract for plates for a shipbuilding concern is pending in this market, which is expected to be placed this week. Our quotations follow: Tank

steel, base, ¼-inch, 1.75c; flange steel, 1.90c to 2c; marine steel, 1.95c; firebox steel, ordinary, 2c to 2.10c; special, 2.25c and upwards. Tank steel from store, 2c to 2.20c; flange steel from store, 2.25c.

MERCHANT PIPE AND BOILER TUBES.—The demand for these materials is quiet, most of the business coming from jobbers who are replenishing stocks. Our quotations follow:

MERCHANT PIPE, RANDOM LENGTHS.

	Black Per cent.	Galv. Per cent.
⅛ to ⅜ and 11 to 12 in	59.5	46.5
¾ to 10 inches	67	54.5

BOILER TUBES.

	Steel Per cent.	Iron Per Cent.
1 to 1½ in	40	35
1¾ to 2½ in	45	40
2¾ to 3 in	55	50
6 in. and larger	45	40

WIRE AND WIRE NAILS.—The local manufacturer reports that it has sold its entire capacity for next year on poultry netting, and has instructed its salesmen to take no more orders. Wire fencing and wire nails are in active demand, the mills having no difficulty in selling its entire output. We quote carloads of wire nails to jobbers, $2.40, Chicago; to retailers, $2.50; plain wire, carload lots to jobbers, $2.35; to retailers, $2.45; painted barb wire to jobbers, carloads, $2.70; to retailers, $2.80; galvanized barb wire, carloads to jobbers, $3; to retailers, $3.10.

OLD MATERIAL.—The committee appointed at the Cincinnati meeting of scrap iron dealers to confer with mill owners with a view to regulating the price of scrap iron, was in Chicago last week and had meetings with representatives of local mills. Nothing definite was accomplished. The buying during the past week has not been very active, both buyers and sellers being in a state of uncertainty as to the plans of the bar iron manufacturers or the action of the Cincinnati committee, and preferring to wait until something develops. We quote as follows:

Old iron rails	$21 00 to $21 50	Old Wheels	$16 00 to $16 50
Old steel rails, long	18 00 to 18 50	Heavy melting steel	13 50 to 14 25
Old steel rails, mixed	13 50 to 14 50	Mixed country steel	10 50 to 11 00
Relaying rails	26 00 to 27 00		

The following are net selling prices per ton:

No. 1 R. R. wrought	$16 25 to $16 75	Iron axles	$21 50 to $21 50
No. 2 R. R. wrought	13 50 to 13 75	Cast borings	4 50 to 5 00
Dealers' forge	13 00 to 13 50	Wrought turnings	10 50 to 11 00
No. 1 busheling	11 50 to 12 00	Iron axle turnings	12 00 to 12 50
No. 1 R.R & mach.cst.	12 00 to 12 50	Steel axle turnings	10 50 to 11 50
Railway malleable	12 50 to 13 00	Stove plates	8 50 to 9 00
Country malleable	11 50 to 12 50	Old iron splice bars	16 50 to 16 75

CLEVELAND

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, Nov 20

Some trouble with frost has been encountered already at upper lake docks, and the ore movement from this time out will be beset with the difficulties of late November. There is little doubt that 20,000,000 tons will be exceeded by the lake movement, and it is possible that the all rail ore will bring the total around 20,500,000 tons. As an indication of the strong conditions in the pig iron market an inquiry has come up for Lake Superior ore to be shipped to Virginia furnaces, an unheard-of procedure. Lake freights are rising and 75 cents has been paid on coal to Lake Superior, while the Escanaba ore rate has advanced to 90 cents.

PIG IRON.—So far as foundry iron is concerned the question has narrowed down with many consumers to one of getting enough iron to prevent a shut-down. Premiums are being paid for early deliveries and $15 at Valley furnace is easily secured for No. 2 foundry on November and December delivery, while as high as $15.25 was paid this week for a carload. Apart from odd lots furnaces have no iron to offer for this year, and with few exceptions are sold up for the first quarter of next year. For the first time since 1899 Virginia iron is being sold in this market, a good indication of the scarcity in Southern grades. The minimum on Southern iron is now $11.50 at Alabama furnace for No. 2 foundry, making the delivered price $15.20 Cleveland. Foundries are buying steadily for next year's deliveries, and the inability of smaller consumers who have long bought from hand to mouth, to get iron for present, pressing needs, is a stimulus to contracting for the second and in some cases the third quarter of next year. For these forward deliveries prices range from $14.50 up to $15, according to time. Forge iron, meantime, is advancing. On Southern $10.50 Birmingham or $14.25 Valley mill, is minimum. Northern gray forge is firm at $14 Valley furnace, with very little available, and on early delivery $14.25 can be realized. Bessemer has advanced to $15.50 at Valley furnace, though it does not appear that the United States Steel Corporation has paid this price as yet. The making of three months' contracts with the merchant furnaces is being considered by the Steel Corporation. As high as $16.45 Pittsburg has been paid for Bessemer in the past week. The Valley furnaces are alternating in bearing the consequences of the car situation and the leading producer of coke is notifying furnaces that have run steadily that they must now take their turn, and bank while coke is doled out to other furnaces that have been interrupted. Furnaces of the Steel Corporation receive full supply. We revise pig iron quotations as follows:

Bessemer	$16 00 to $16 25	Scotch No. 1	$15 75 to $16 25
No. 1 Strong F'dry	15 75 to 16 25	Scotch No. 2	15 25 to 15 75
No. 2 Strong F'dry	15 25 to 15 75	Gray forge, Valley	14 00 to 14 25
No. 3 Foundry	14 25 to 14 50	LakeSuperior charc'l	17 00 to 18 00

FINISHED MATERIAL.—Apart from bars and plates the market shows a persistence of the strength of preceding weeks and even an increase in some instances. The plate trade shows somewhat more activity in spots, but its improvement is prevented by the conditions in structural steel. Consumers like the shipyards would use up a much larger tonnage of plates if they could get the shapes that must go into construction simultaneously. The bar trade shows temporarily the effect of an advance in iron beyond that of steel, but there is a steady business from car works and some large buying ahead on the same account. The American Shipbuilding Co. has booked another boat for the Mutual fleet and will buy 2,500 tons of plates and shapes for it. Another boat is pending. The situation in sheets is unchanged, though the mills are doing slightly better in the way of delivery. We quote prices to consumers: No. 12 blue annealed, 2.35c to 2.40c; No. 16, 2.60c; Nos. 22-24, one pass through cold rolls, 2.80c; No. 27, 3c; No. 28, 3.10c. Bars are unchanged at 1.50c Pittsburg for iron and steel. Mills in the market for steel billets and slabs find the supply available even for forward delivery is small, and for quick delivery there is practically none available.

OLD MATERIAL.—The local market is irregular. Prices should be strong in sympathy with conditions elsewhere, but the supply in some lines is greater than in others. Prices are still unchanged, however, and there is less likelihood at the present time of any reduction. We quote as follows, all for gross tons:

Old steel rails, rolling mill lengths	$17 00 to 18 00
Old steel rails, short lengths	16 50 to 16 75
Iron rails	21 00 to 22 00
No. 1. railroad wrought	16 50 to 17 00
Mill scrap	14 50 to 15 50
No. 1. machine scrap	14 00
Cast borings	7 50 to 8 00
Grate bars	9 00
Sheet iron	9 00 to 9 50
Stove plate	9 75 to 10 00
Car wheels	15 00

CINCINNATI.

Nov. 19

There is no appearance of a let-up in the heavy demand and there is no immediate relief in sight from the most serious car shortage ever experienced. A Hanging Rock furnace owned by Cincinnati capital has its own cars and they are generally kept engaged in hauling coke from the line of the Norfolk & Western to the furnace. Now the cars are scattered and the coke ovens cannot promise any delivery and the furnace is drawing what coke it can get from all directions. Southern furnaces are being banked daily and the largest coke producer in the world reports that it could use 600 more cars a day if it could get them.

The consumption of iron goes on without any decrease. The foundries are having a larger business than ever in their history. An interest in Cincinnati wanted some special castings this week and was willing to wait for two months or so. But three foundries were found that were even willing to figures with the concern for the castings to be delivered even within three months. Manufacturers of all lines are full of business. Machine tool concerns are running at night, not because they are trying to catch up, but that they are trying to keep from getting any farther behind. Shipments of general merchandise out of Cincinnati were never so heavy

and the freight yards and depots are entirely inadequate. One of the local roads has had plans drawn for a new freight shed 600 feet long, but put off building because it was impossible to get the structural material. The old shed burned down two weeks ago and now the company is compelled to go ahead with the new shed and substitute heavy wooden beams and rafters for the steel. In many places over the city buildings run up half way with brick and steel stand idle waiting for the arrival of structural steel long past due. Officials of the Big Four stated last week that if the road should get any farther increase of business it would be necessary to build and equip a new railroad in order to handle it. One of the officials of a Southern road said that if dull times were to come there would not be siding enough on his entire line to hold the empty freight cars that are now busy in all sections. This is a commentary on business conditions all the way through.

PIG IRON.—Since the last report there has been a general advance of 50 cents a ton in pig iron. There are some interests that are selling 25 cents under the higher price, the same as they did when the recent advance was made, but the market is mainly firm at the higher quotations. Generally at this time of the year the demand for pig iron shows a little let-up and the contracting for the first half of the new year is largely over. It is then that the furnaces are given a chance to make up stocks and catch up with the business. This year, however, there has been witnessed no such condition. Even if it were possible to get coke and cars and all furnaces could keep right on, the demand has been such that there would not now be any surplus to speak of. Buying for delivery during the first half of the year has kept steadily up. The largest single transaction was for 10,000 tons of Southern iron for a pipe foundry. A Cincinnati house also sold 8,000 tons of foundry iron to an Eastern concern. Last week was probably a record breaker as far as the tonnage of iron sold in Cincinnati was concerned. One firm found orders in its mail Monday morning for 12,000 tons. Furnaces are now largely sold up as far as March 1 and the earliest delivery that any of them can promise is after the first of the year. Quotations f. o. b. Cincinnati are:

Southern Fdy. No 1	$14 50 to $14 75	Gray Forge	$13 00 to $13 25
" " 2	14 00 to 14 25	Northern Fdy. No. 1	15 75 to 16 00
" " 3	13 50 to 13 75	" " 2	15 25 to 15 50
" " 4	13 00 to 13 25	Charcoal C. W. iron	17 75 to 18 25
So. Fdy. No 1 soft	14 50 to 14 75	Malleable coke iron	15 25 to 15 75
So Fdy. No. 2 soft	14 00 to 14 25		

FINISHED MATERIAL.—The demand is still good and the carriage manufacturers have come into the market on something of a larger scale during the past week. The agricultural implement makers are also good buyers. The demand for structural iron and steel is better than ever, taking into consideration the time of the year, and an open winter and favorable spring will cause a heavy rush in this direction. Sheets and plates are wanted badly and deliveries are not as yet such as to allay complaint. Bars are moving more readily and are in good demand. Prices remain firm, iron bars on a basis of 1.50c Pittsburg, selling at 1.62c, Cincinnati, and steel bars at the same price. Angles are 2c and plates 1.85c to 1.90c. Sheets, No. 28, are 3.35c to 3.40c, and No. 12 blue annealed, 2.35c.

OLD MATERIAL.—Scrap is firm to advancing in sympathy with the market for pig iron. The dealers report that the movement is good, but that there has been no very large transaction. Dealers' quotations to consumers are as follows:

Old No. 1 Wrought Railroad	$ 15 25 to 15 50
Cast Machine and Foundry	12 50 to 12 75
Old Iron Rails	20 00 to 20 50
Old Steel Rails	15 50 to 16 50
Old Short Lengths	14 00 to 14 25
Old Iron Axles	20 25 to 20 75
Old Iron Car Wheels	16 00 to 16 25
Stove Plates	9 75 to 10 00
Wrought Turnings, net tons	11 25 to 11 75
Cast Borings, net tons	5 50 to 6 00

PHILADELPHIA.

Nov. 19.

Under existing favorable conditions it would be comparatively easy to advance prices, and there is a feeling in the trade that a rise may mark the closing weeks of the year. The difficulty being experienced by transportation interests in furnishing sufficient equipment to move the freight offered is causing uneasiness to producer and consumer alike. It is pointed out that a blockade from inclement weather, such as may be expected at this time of the year, would have serious consequences and further emphasize the car shortage. While nominal prices prevail for future deliveries, immediate wants are only filled after a premium is added.

PIG IRON.—Considering the present rate of consumption, stocks on hand are the smallest on record, aggregating less than 275,000 tons, and the demand for immediate delivery tends to make the shortage of supplies felt all the more. Producers are doing their best to divide up their shipments so that all may be kept going, but in many cases it is a day-to-day fight to secure material. Makers of pig iron are accepting current prices for next year's deliveries, with a small advance for shipments which are to be made within thirty days. Quotations, based on sales which have been made for the first and second quarter of the coming year, are about as follows for Philadelphia and nearby points: No. 1 X foundry, $15.75 to $16; No. 2 X foundry, $15.25 to $15.75; No. 2 plain, $14.75 to $15; standard gray forge, $13.85 to $14.15; ordinary gray forge, $13.25 to $13.50; basic (chilled), $14 to $14.25.

FINISHED MATERIAL.—In structural material the mills are so overloaded with orders and with others waiting for acceptance that but little change is probable for a long time. The bar market is quiet, with inquiries for heavy lots from car builders, prices being firmly maintained through the existing selling agreement. Plate mills are doing an average business with prospects for full employment during the winter months, and considerable new business in sight from the shipyards. Some difficulty is encountered in securing certain sizes of sheets for prompt shipment, there being but little abatement in the demand, with stocks pretty well cleaned up. As a whole prices are steady and for seaboard and short distance deliveries will average: Plates, ¼-inch and thicker, 1.75c to 1.80c; bars, iron or steel, 1.62½c to 1.70c; angles, 1.75c to 1.85c; beams and channels, 1.75c to 1.85c.

OLD MATERIAL.—An unsettled condition has followed the announcement that the Eastern Bar Iron Association has determined to establish a central purchasing agency, which will distribute orders for old material covering the requirement of the mills. This is calculated to prevent prices being bid up one against the other, and will also effect certain economies in the matter of freights. While no official statement has been made, it is generally believed that the scheme will be put into operation at an early day. Bids and offers are about as follows for deliveries in buyers' yards: Choice railroad scrap, $19 to $20; ordinary light scrap, $12.25 to $12.75; machinery cast, $13.75 to $14.25; heavy steel scrap, $17 to $17.50; old iron rails, $21 to $21.50; old steel rails, short lengths, $17 to $17.50; wrought turnings, $11.75 to $12.25; cast borings, $7.75 to $8.25; old car wheels, $15.75 to $16.25; old iron axles, 23 to $24; old steel axles, $19 to $20.

Increasing Rail Finishing Capacity.

(Special Telegram.)

PITTSBURG, Nov. 20.—The finishing department of the Edgar Thomson rail mill of the Carnegie Steel Co. is to be greatly improved to facilitate the finishing of rails. The rolling department, however, will not be increased in size. There will be no regular shut-down for repairs over the holidays owing to press of business.

The directors of the Lake Superior Power Co., which controls the extensive railway steel works, pulp works, iron mining and other enterprises, directed by F. H. Clergue, say in their annual report: "The amount of net earnings which will be realized from June 30, 1901, to June 30, 1902, upon the sale and transportation of iron ore from the Helen iron mine, will alone be sufficient to pay the entire preferred stock dividend of the company during the period named. This statement is based upon earnings now being realized, without considering the increased value which will result from mixing the Helen ore with the high-grade Bessemer ore from the Josephine mine. The large earnings, therefore, which will certainly be derived during the same period of time from the steel works, government bonus, ground wood and sulphite-pulp mills, ferro-nickel works, sulphuric-acid works, water-power rentals, railway and steamship operations, timber sales, and the sales of ore from other than the Helen mine, will all be tributary either to surplus account or for dividends upon the common stock of your company."

THE IRON TRADE REVIEW

Devoted to the Machinery, Metal-Working and Foundry Trades, and Iron and Steel Manufacture.

PUBLISHED EVERY THURSDAY BY

THE IRON & STEEL PRESS CO.,

ROSE BUILDING, CLEVELAND, OHIO.

G. H. GARDNER, President and Treasurer.
JOHN A. PENTON, Vice-President.
A. I. FINDLEY, Secretary.

A. I. FINDLEY, - - - - - - - - - - - EDITOR.
ROBERT I. CLEGG, - - EDITOR MACHINERY DEPARTMENT.

CHICAGO : 934 Monadnock Block, GEO. H. GRIFFITHS, Manager.
PITTSBURG : 429 Park Building, A. O. BACKERT, Manager.
NEW YORK : 150 Nassau St., D. C. WARREN, Manager.

Subscription, $3.00 per annum. To Foreign Countries, $4.00.
Advertising Rates Furnished on Application.

The Cleveland News Co. will supply the trade with THE IRON TRADE REVIEW through the regular channels of the American News Co.

ENTERED AT THE POST OFFICE AT CLEVELAND, O., AS SECOND CLASS MATTER

NOVEMBER 21, 1901.

THE EVOLUTION OF THE AUTOMOBILE.

The close of the highly successful exhibition of automobile machinery at Madison Square Garden, New York, and the record-breaking performances that are now so much in vogue among the operators of racing motor-vehicles, suggest a similar stage in the history of the now moribund bicycle craze. There is the same keen interest of manufacturers and inventors in the utilization of every contrivance of a speed gaining character. The carving away of all possible weight to a very slight margin of safety and the abandonment of every device that does not aid in speed acquisition are only history repeating itself in the mechanics of road transportation. There is the same furor of track and road racing, with the same rapid succession of record making and record breaking; the same legal complications over the respective road rights of the horseman and the chauffeur. It is indeed so clearly a parallel case that the query becomes inevitable, Will the automobile run its fashionable race and then abandon that progressive and useful purpose that bids fair to place it among the permanent factors for a greater development of road transportation?

But a few years ago financial circles were approached with the alluring promises of the promoter and many automobile companies were exploited at huge capitalizations. The prospectus in every case was rich in promises and the promising characteristic never failed to be a prominent feature. The years that have elapsed have not dealt kindly with most of these organizations. Some have stood the test at a cost of time and money that the sanguine promoters could never have realized.

Part of the trouble lay with the undervaluation of the ability of the horse—an inadequate estimate of his available strength. The horse is capable of exerting much more than a horse-power for a limited period; and this statement involves no contradiction in terms, paradoxical though it may seem. In addition to the special effort that the horse can make upon occasion, the animal may add his ponderous weight advantageously to the starting of a dead load. Contrast this with the machine, limited to a certain output and this reduced to that minimum amount consistent with the installation of the lightest permissible machinery. The machine is crippled at the start by the unfavorable condition of the parts. Efficiency is dependent so much upon a given rate of speed that during the acceleration of the motor up to this velocity the vehicle fails to get the impulse credited to the machine under working conditions.

There was another obstacle in the way of the effervescent promoters and that lay in the difficulty in acquiring master patents. The motor vehicle was not entirely a latter-day exploit. The early part of the 19th century had seen remarkable development in this branch of the mechanic arts, as has been shown in a recent article in these columns. Many of the much-vaunted schemes failed to find a permanent place, therefore, because of lack of originality. But even more frequently the failure rested upon the score of an utter lack of appreciation of the mechanical difficultis involved in the construction of a practical machine.

Today the conditions have changed and the problem, if not yet capable of complete solution, is better understood and the road to a practical application of the principles thought out by the pioneer workers is the more clearly outlined. The steam carriage has been developed along the lines laid down by the Stanley Brothers a few years ago and a mile record has been established of 1:15. The gasoline machine is announced as having covered the same distance in 51 4-5 seconds. An electric machine has traveled over the same country road under like conditions in 1:03 for a mile.

Of what practical use are these remarkable exploits? Are they any more useful than the struggles for yachting supremacy, that fail to have any notably beneficial influence upon the shipbuilding art? The contests certainly advertise the present state of the art and the power possibilities of the motor-driven machine; and in attracting attention they may focus the capabilities of the expert mechanic upon the problems incidental to the adaptation of these toys of the speed merchant to the relief of the heavily-laden beast of burden.

STEEL SHEETS FOR ELECTRICAL WORK.

A branch of the sheet steel trade which has not been exploited as thoroughly as it should be is the manufacture of sheets for electrical purposes. It is not true, however, as has recently been stated, that one of the largest electrical machinery makers has been compelled to place an order for 2,000 tons of sheets in Germany, either on account of the strike in the United States, or for any other reason. Our imports of sheets are confined very largely to sheets for deep stamping, and the small quantity we do import comes almost entirely from England, and not from Germany. Our imports of sheets generally run less than 2,500 tons a year, and of this amount less than 5 per cent usually comes from Germany.

Just what physical and chemical characteristics

should be given sheets to produce the best results is a matter which is determined under present conditions largely by the "cut and try" method, and great latitude as to heat treatment is given the sheet manufacturer. For armatures it is desired that sheets should have as great magnetic permeability as possible, show as small loss as possible from hysteresis, and have as high electrical resistance as is compatible with the production of the two other desirable qualities. Purity conduces to permeability, while hysteresis is probably almost wholly a matter of heat treatment. A high electrical resistance reduces the loss from eddy currents, which, however, are kept down largely by using thin sheets.

It is pretty well established that the manganese in electrical steel should be kept decidedly low, the carbon should be rather low, while the phosphorus should not be too low. One of the largest manufacturers specifies: Carbon, .08 per cent; manganese, .35; phosphorus, .04 to .08, and sulphur, .04 per cent or under. Another large maker prefers the carbon to run from .10 to .13 per cent and the manganese from .30 to .35 per cent. The hardness which would result from a higher content of manganese would increase the hysteretic loss, while a lower phosphorus than .04 per cent would make the electrical resistance too low and would cause difficulty in the annealing which all sheets for armature work must undergo after stamping, as the stamping produces hardness. The annealing is done by the machinery manufacturers and consists in raising the sheets to a temperature of about 950° C. or 1742° F., there being the double object of softening the sheets and producing a non-conducting film of oxide on the surface. At such a high heat the danger from sticking is, of course, considerable. A peculiar fact noticed in this class of work is that sheets of a certain composition, if maintained for a few weeks at a temperature of 60° C. or a little higher, show a very high hysteretic loss and must be re-annealed. The fault here lies with the machinery manufacturer, as the resistance of the coils should be kept low enough, and the means for ventilation good enough, to avoid the possibility of any such temperature being reached.

Closer working relations between the electrical machinery makers and the manufacturers of sheets would no doubt result in a much better understanding of a subject on which both sides are now evidently somewhat in the dark.

On Nov. 1, 1900, a few days previous to the re-election of President McKinley, the number of active blast furnaces in the United States was 201, or the smallest for any month following March 1, 1899, when the number active was 192. The weekly capacity of the furnaces active on Nov. 1 last year was 215,304 tons. So small an active productive capacity has not been recorded at any time since, and we must go back for anything smaller to Sept. 1, 1898, when the weekly capacity active was 213,043 tons. Since the National election last year there has been a great and almost uninterrupted gain, and at the beginning of this month the production of pig iron had risen to the unprecedented figure of 320,824 tons. This is at a yearly rate of 16,700,000 tons, or at a rate of nearly 5,500,000 tons per annum more than at this time one year ago. To intensify the difference, stocks of pig iron are now decreasing, while one year ago they were increasing, and iron was then going abroad in considerable amounts, whereas today exports are practically nil. We are undoubtedly consuming iron today at the astonishing rate of between 6 and 6½ million tons a year greater than the rate of one year ago.

Lake Superior Iron Mines.

The famous Minnesota ore road cases were disposed of by the railroad commission of that State last week. The contention of the roads that as they are engaged in inter-State commerce they are not bound to file their rates with the State commission, is sustained, except that the roads are required to file their rates on all ore whose furnace destination is a Minnesota point. At present there is no ore shipped for consumption in Minnesota, and the rail rates on ore therefore remain undisturbed.

The Jeffrey mine, near Mountain Iron, Minn., has been sold by Albert C. Hubbell, Thos. A. Merritt and others to a furnace interest for $125,000. The Jeffrey adjoins the Wacouta, controlled by the LaBelle Iron Co., of Steubenville, O., and is believed to contain not less than 5,000,000 tons of ore. Messrs. Hubbell and Merritt are also exploring for ore on the lands of the Mesaba Iron Co. on the east Mesaba, with fair prospects.

The Cleveland Cliffs Iron Co. has made some changes in its mine captains preparatory to sinking a shaft at its new mine to be opened in the eastern part of Ishpenning, Mich.

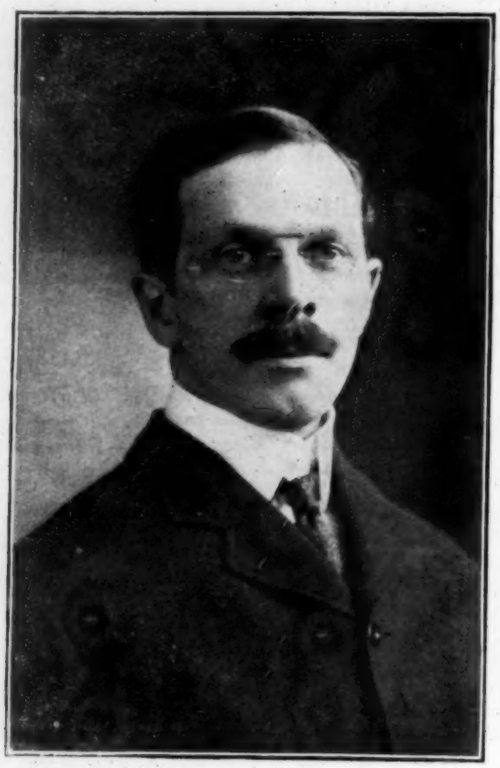
The Section 21 mine of the Lake Superior Iron Co. promises to develop into one of the largest in the Ishpeming district. *Iron Ore* says: "For some weeks part there has been a repairing and changing in the shafts to permit of greater outputs in future in case the demand is made. In the east shaft there will be two-ton skips and a cage. A new Prescott pump now takes the place of the old one, and requires less men and fuel to care for it, the saving daily being considerable. The company is exploring for ore on Section 20 and we hear the Cleveland Cliffs will put down a drill hole some distance to the south, on Section 29. The location is a favorable one for ore and we expect to hear of other mines in that vicinity."

The plant of the American Turret Lathe Mfg. Co. is to be located at Warren, Pa. The survey of the site has been completed and the stakes set for the proposed buildings. The plans now under way provide for the construction of the following buildings: an erecting shop, 60x300 feet; a fitting room 30x150 feet; a store room, 30x210 feet; a wash room, 30x90; a machine shop, 150x210 feet; a power house, 30x60; a forge shop, 30x60; office and drawing room, 30x90 feet; a pattern shop, 30x60 feet and a tool room, 30x150 feet. A total of 75,000 square feet. The several buildings will be one story high, and lighted by a saw-tooth roof. The frame work will be of structural steel, with brick walls, cement floors and slag roofing. The machine equipment will consist of more than 125 machine tools of the latest design. A number of special machines will be built in the plant for their own use; these will include a duplex cone-pulley turning lathe, an eight spindle gang lathe, a spindle turning lathe and a duplex milling machine. The plans call for five- and ten-ton traveling cranes, light jib cranes, pneumatic hoists, narrow gauge industrial railways, etc. The power house will contain two gas engines driving electric generators. The distribution of power will be electrical, it being the purpose to drive the larger tools individually. All the belt driven tools will be equipped with a new variable speed countershaft, invented by Mr. Conradson. The complete plans call for a foundry, but its construction will be deferred until the machine shop is in working order.

The Lunkenheimer Co. of Cincinnati has recently installed an electric traveling crane, made by the Northern Engineering Works, crane builders, Detroit, Mich. The crane is designed for floor work and is operated from the floor, replacing a hand power crane on similar duty.

NEW OFFICERS OF THE N. F. A.

The election of officers at the New York convention of the National Founders' Association brings into prominence two of the younger members of the administrative council—Wm. D. Sargent, the new president, and F. T. Towne, the new vice-president. These with John R. Russel, of Detroit, the treasurer, and John A. Penton, the commissioner and secretary, make up the working officers. All are young men and their choice exemplifies again the tendency to put even the younger young men to the front. Mr. Sargent, the new executive head of the association, is president of the Sargent Co., 687 Old Colony Building, Chicago. He is also president of the American Brake Shoe Co., which concern he organized in 1888, and president of the Railway Appliances Co., with offices at the same address as the Sargent Co. Mr. Sargent is a practical foundryman and machinist, having worked for 18 months as a molder and in other capacities in the shops of the Ramapo Wheel & Foundry Co., then of Hillburn, N. Y., and for a year as machinist in the shops of the Pullman Co., Pullman, Ill. He subsequently became superintendent of the Sargent Co.'s plant at 50th and Wallace streets, Chicago, and later manager and vice-president of the company. He was elected president last June. Mr. Sargent was born in Boston in 1864, but is Western bred, his parents having moved to Des Moines when he was but a child. He is a graduate of Chicago high schools and of the Northwestern University, Evanston, Ill., and for a time attended the Massachusetts Institute of Technology at Boston.



W. D. SARGENT, PRESIDENT.

F. T. Towne, of Stamford, Conn., secured his technical education at the Massachusetts Institute of Technology. On completing his course he entered the employ of the Yale & Towne Mfg. Co. He is now general superintendent of the company's Stamford and Branford plants.

In an affidavit to the Industrial Commission, an official of the Pressed Steel Car Co. says: "During the year 1901 the amount of the company's product will be about as follows: Number of cars built, 24,300; bolsters built, 81,800; truck frames built, 39,900; in addition to a large number of pressed steel specialties for use in car construction. The value of this product will amount to about $24,000,000. The company has been exporting about 3 per cent, and this will undoubtedly extend largely in the near future. A shipment of 450 cars will be made in a few weeks to New South Wales, Australia. Our prices for export are made up on the same basis as those for our domestic trade."

NEW YORK MEETING A. S. M. E.

Announcement is made of the 44th meeting of the American Society of Mechanical Engineers, to be held at the society's parlors, 12 West 31st street, New York, Dec. 3-6. The annual address by President S. T. Wellman will be given on Tuesday evening, Dec. 3, on "Early History of Open-Hearth Steel Manufacture in the United States." On Thursday evening reports will be presented from the committee to codify and standardize the methods of making engine tests and the committee on standardization of engines and dynamos. The papers scheduled for the various sessions are as follows:

"A Portable Accelerometer for Railway Testing," by F. B. Corey.

F. T. TOWNE, VICE-PRESIDENT.

"A Bonus System of Rewarding Labor," by H. L. Gantt.

"A Silent Chain Gear," by J. O. Nixon.

"The Bursting of Small Cast Iron Fly Wheels," by C. H. Benjamin.

"A New Valve Gear for Gas, Steam and Air Engines," by E. W. Naylor.

"The Potter Mesh Separator," by F. A. Scheffler.

"Working Loads for Manila Ropes," by C. W. Hunt.

"The Heat Engine Problem," by C. H. Lucke.

"Experiments on Spiral Springs," by C. H. Benjamin and R. A. French.

"Water Power Development at Hannawa Falls," by W. C. Johnson.

"The Porro Prism," by W. R. Warner.

"Effect of Clearance on the Economy of a Small Engine," by Albert Kingsbury.

The spring meeting of 1902 will be held at Boston.

William Henry Patterson, vice-president of the Illinois Car & Equipment Co., died at New York, Nov. 18. He was born April 21, 1855, at Germantown, Pa., and was a graduate of the University of Pennsylvania, of the class of 1876, and of the Pennsylvania Law School. He went to New York in 1895.

CHEMIST, ENGINEER OF TESTS AND PHYSICIST.

Their Contributions to the Present Advance in Steel Manufacture.

BY ALBERT LADD COLBY, SOUTH BETHLEHEM, PA.

The part which the steel works chemist has taken in the progress made in the last twenty years in the economic manufacture of steel is often lost sight of. This is not surprising, for in looking back over the last decade of steadily increasing outputs, attention is naturally centered on the large blast furnaces, open-hearth plants, rolling mills, etc., and credit most deservedly given to those who have designed and erected them.

The metallurgical operations carried on in these large furnaces were, however, perfected by laboratory research; and the demand for increasing rapidity in manufacturing operations, without fatal irregularity in the product, was only made economically possible by the skill and originality of the steel works chemist in developing rapid and accurate analytical methods by which frequent checks on each manufacturing operation could be made. In this connection particular credit should be given to those conscientious chemists who refused the demands of furnace superintendents for quick reports, unfil they had perfected methods giving quick returns without sacrifice of accuracy. Much thought was given to the study of chemical reactions and conditions, and great ingenuity displayed in designing special forms of apparatus, before such important practical results as the following became part of the daily routine of American steel works laboratories.

In blast furnace practice the percentage of silicon, sulphur and phosphorus contained in a cast of pig iron is known before the pigs are cold enough to be loaded from the casting house on to cars for shipment; or if the iron is tapped into ladles and run on to a casting machine, this same information is given before the cars loaded with the machine-cast pigs leave the works. When selling pig iron on guaranteed analysis the economies due to this prompt information are apparent. Even if the ladles of iron are poured into a mixer, or directly into an open-hearth furnace or Bessemer converter, the silicon is known before the ladle is empty.

Silica is determined in one flush of cinder before the next flush occurs; and an analysis of the furnace gases, including carbonic acid, carbonic oxide, hydrogen, hydro-carbons and nitrogen is reported an hour after the sample has been taken.

The mining and shipping of iron ore running near the Bessemer limit, and varying in phosphorus in different parts of the mine, has been successfully and economically regulated by quick phosphorus determinations. In making special pig iron, cars of fuel and flux, sufficiently low in phosphorus, have been selected without delay in holding cars.

In open-hearth practice the percentage of carbon and phosphorus is accurately determined in the bath at stated intervals, and at certain stages in making special open-hearth steels, the percentages of manganese, silicon, nickel and chromium are also determined. Special sizes and weights of billets of Bessemer and open-hearth steels, of guaranteed chemistry, are often rolled direct from the ingot. In such cases the carbon, manganese, sulphur, phosphorus and silicon can be reported before the ingot leaves the soaking pit, and the heat rolled into billets of another size if not of the composition aimed for.

The engineer of tests has also devoted much energy and skill to the study of the physical properties of steel and methods for their determination, and his earnest labors have proved an important factor in the progress made in the improvement of the quality of the steel made today.

Chill tests at blast furnaces, and at Bessemer and open-hearts plants the quick forge tests, hot and quench bending tests, made by means of a small steam hammer, have become valuable guides during manufacture, and in some cases have proved a sufficient check without quick chemical analysis.

Milling machines for the rapid preparation of specimens, and improved tensile and drop testing machines have made thorough testing possible without any delay in manufacture, and through the agency of standard test specimens and uniform methods of testing, results from different makers have been intelligently compared.

Special forms of apparatus have been designed by the testing engineer for determining the elastic limit, extension and contraction of area of steel.

With economic methods of chemical and physical testing at hand, the influence of the chemical composition on the physical properties of steel could be intelligently studied, for the results of many tests could be compared. The information thus obtained has been of inestimable value to both the maker and user of steel.

The physicist has also materially aided in the advance made in steel metallurgy and in the application of steel in the arts. The practical application of the pyrometer at blast furnaces and steel works, and the acknowledged value of the microscope as an accessory to the uniformly successful heat treatment of steel, are offered in evidence.

By determining the critical points of various steels, the physicist has pointed out to the steel maker the heat treatment giving the best combination of physical properties in his product, and by studying the influence of various elements on the magnetic and electrical properties of steel, he has introduced special steels for many purposes for which the steel maker, unaided, would never have discovered.

This review, though necessarily very incomplete, gives ample evidence of the great practical value of the contribution of the chemist, the testing and inspecting engineer, and the physicist in advancing to its present state of perfection the art of making good, cheap steel—by far the greatest triumph of the twentieth century.

The Youngstown Engineering Co., Youngstown, O., has O., has purchased the plant and the patent rights of the New Process Galvanizing Works at Niles, O. Sheets will be galvanized by this process by the new Youngstown concern.

The Pomeroy plant of the American Steel Hoop Co., located at Pomeroy, O., will be dismantled and the machinery will be installed among the various plants of the American Steel Hoop Co., at Youngstown, O.

The Youngstown Engineering Co., Youngstown, O., has been awarded a contract for the construction of 40 barbed wire machines by the Sharon Steel Co., of South Sharon, Pa. The machines are to be installed in the wire plant of the Sharon Steel Co. Some of the machines will be ready for installation by the first of the year.

The Ballston Spa, New York, plant of the American Ax & Tool Co. was closed permanently last week and the machinery is now being shipped to Glassport, Pa., where the new plant of the company is located.

The Standard Traction Brake Co. of 120 Liberty street, New York City, has recently received a large order for axle and motor-driven brake equipment for the Massachusetts Construction Co., 60 State street, Boston.

The Means-Fulton Iron Co., of Birmingham, Ala., has been awarded the contract for the erection of the stock house for the new furnace of the Thomas plant of the Republic Iron & Steel Co. at Birmingham.

Officials of the Carbon Steel Co., Pittsburg, Pa., deny that their plant is under consideration for absorption by the proposed new combination of plate manufacturers, which is to include the manufacturers in the East.

G. Martin Brill, president of the Brill Co. of Philadelphia, has purchased a tract of land at Preston, England, in the vicinity of the River Ribble and the Preston docks as a site for a new plant for the manufacture of cars and railroad trucks. It is said that the establishment when completed will employ 500 to 600 workmen.

The Eagle Steel Co. of Cincinnati, O., has been incorporated with $10,000 capital. C. B. Lewis, J. W. Hull, Louis Reemelin, C. Muller and Richard H. Powell are the incorporators.

COMPANIA FUNDIDORA DE FIERRO Y ACERO DE MONTEREY.

The making of iron and steel from the ores of Northern Mexico was for years a favorite project of the late Don Patricio Milmo, upon whose estate large deposits of coal and iron were known to exist. Interested with Milmo was Mr. Eugene Kelly of New York, and in the consideration of the subject quite a number of examinations were made by different engineers. Failing health caused Mr. Milmo to relinquish any active part in the matter, but Mr. Kelly carried on the project and associated himself with Don Vicente Ferrara of Monterey, Mexico; Antonio Basagoiti and Leon Signoret of the City of Mexico, and other prominent gentlemen of New York, Monterey and the City of Mexico, and founded a company subsequently in May, 1900, known as the Compania Fundidora de Fierro y Acero de Monterey, with a capital of $10,000,000. The organization of the company is as follows: Vicente Ferrara, president; Isaac Garza, vice-president; Constantino de Tarnava, treasurer, and Adolfo Zambrano, secretary. The board of directors is constituted as follows: Antonio Basagoiti, Eugene Kelly, T. Bramff, Isaac Garza, Leon Signoret, Vicente Ferrara, Adolfo Zambrano, Valentini Riviero and Ernesto Madero.

The reasons for locating at Monterey were many. It is the center of all the known deposits of iron ore of a Bessemer quality and the larger part of the available coal in the republic. Assuming Monterey as a center, and the distance from Monterey to Laredo as a radius, the circle so described will contain all the known deposits of iron ore of a Bessemer quality and a larger part of the available coal in Mexico. At the same time Monterey possesses the advantage of being connected with all the trunk lines of the republic, and by them is connected with the Gulf of Mexico. Monterey therefore possesses the conditions necessary for a manufacturing plant, viz.: cheapness in the assembling of raw materials and means for a wide distribution of the product. Monterey also contains a number of enterprising citizens who have been successful in mining, smelting and manufacturing operations, and has a sufficiently large population to supply the necessary labor.

The company's iron mines are on the Carrizal mountain, on the Mexican National Railroad and at Monclava on the Mexican International Railroad. As the mines on the Carrizal mountain are sufficiently large to supply all the present needs, two mines, the Piedra Iman and the Ancillo de Fierro, are being developed. They are reached by a branch of the Mexican National Railroad, five miles from Golondrina station. The ore is brought to the loading terminal by two Bleichert tramways, arranged to load 1,000 tons per day. The outcrop of the Piedra Iman is 79 feet in width, and 300 feet in height, and the outcrop of the Ancillo de Fierro is 120 feet in width. Developments indicate persistence of the deposits. A third very large deposit is the Cinco de Mayo, which will be developed as the occasion requires.

There is a great variety of ores, the Piedra Iman being magnetite, the Ancillo de Fierro hematite and the Cinco de Mayo, brown hematite. Analyses of the ores made by Dr. Otto Wuth of Pittsburg are as follows:

ANALYSES OF IRON ORES IN THE MONTEREY, MEX., DISTRICT

	Piedra Iman. Magnetite.	Ancillo de Fierro Hematite.	Cinco de Mayo Brown Hematite.	Monclova.	
				No. 1.	No. 2.
Silica	5.41	2.42	2.90	2.51	3.85
Alumina	1.03	79	1.12	1.51	1.04
Peroxide of iron	.....	96.22	78.86	95.05	93.42
Magnetic iron	90.83	.....	.....	.....	.....
Lime	1.93	.10	4.25	.38	.85
Magnesia	.42	trace	1.60	.12	.05
Peroxide of Manganese	.25	.37	4.51	.43	.27
Sulphuric acid	trace	none	trace	trace	.47
Phosphoric acid	.130	.101	.051	.101	.050
Copper	none	none	trace	.....	.....
Metallic iron	65.78	67.35	52.02	66.53	63.39
Phosphorus	.056	.044	.022	.044	.022

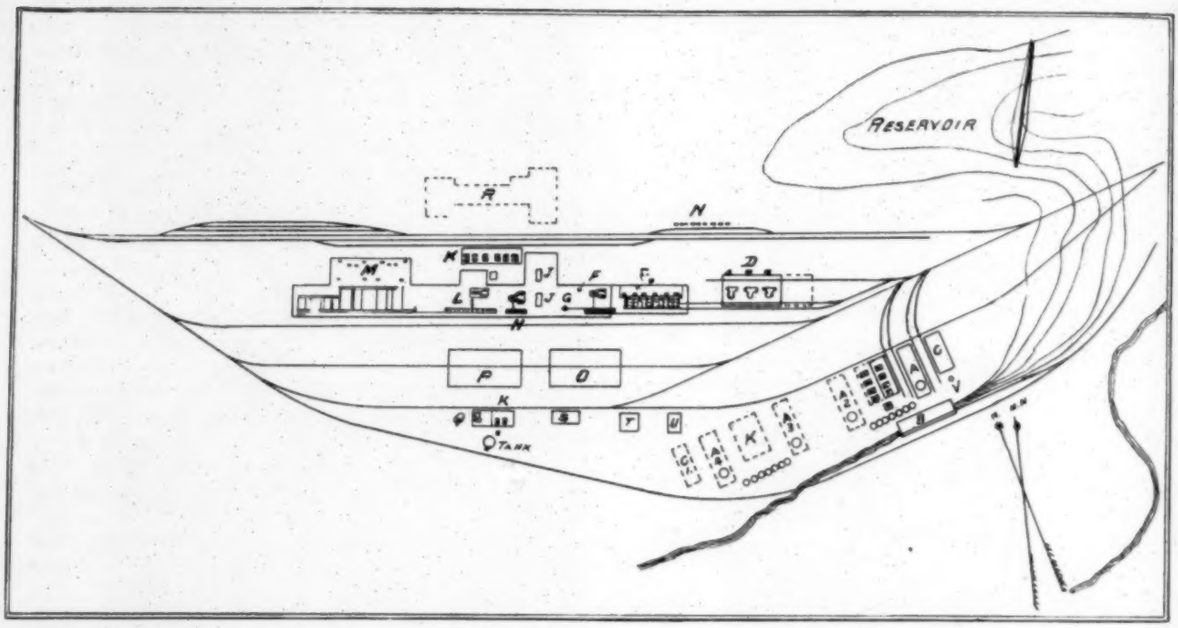


FIG. 1.—GROUND PLAN OF THE PLANT COMPANIA FUNDIDORA DE FIERRO Y ACERO DE MONTERREY, MONTERREY, MEX.

A, A2, A3, A4—Blast furnaces.
B—Stock house.
C, C1—Blowing engines.
D—Open-hearth department.
E—Soaking pits.
F—Blooming mill.
G—Shear.
H—Roughing mill.
J J—Re-heating furnaces.
K K K—Boilers.
L—Finishing mill.
N—Gas producers.
O—Foundry.
P—Machine shop.
Q—Electric power house.
R—Plate mill.
S—Forge shop.
T—Warehouse.
U—Oil house.
V—Stand pipe.

The company owns 30,000 acres of the Laredo coal field, and is largely interested in the coal field at Barrateran. Developments by the Mexican Coal & Coke Co., at Barrateran show a coal seam of nine feet in thickness, and of a quality such as to make a coke suitable for blast furnace use. The analysis of the Barrateran coal and coke is as follows:

	Coal.	Coke.
Moisture	2.00	None
Volatile matter	20.50	1.40
Fixed carbon	67.70	87.30
Ash	9.80	11.30

Monterey being in a limestone district, the flux is of an exceptional quality, and the quantity is practically inexhaustible. Manganese ores varying from 49 to 55 per cent of metallic manganese and low in phosphorus are available, so that the products of manganese needed will not require to be imported.

The Steel Works Near Monterey.

The manufacturing plant of the Compania Fundidora de

Fierro y Acero de Monterey is located on a tract of land about 600 acres in extent, and three miles east of the city of Monterey. The buildings are all of steel and brick construction, the steel work being done by the American Bridge Co. A number of the buildings have already been completed and work on the blast furnace is well under way. The dimensions of the buildings are as follows:

Blast furnace stock house, 200x50 feet.
Blast furnace cast house, 180x50 feet.
Blast furnace blowing engine house, 130x50 feet.
Blast furnace boiler house, 135x50 feet.
Open-hearth building, 204x100 feet.
Soaking pit building, 234x91 feet.
Mill building, 1284x100 feet.
Boiler house for mill, 200x50 feet.
Rail finishing mill, 196x50 feet.
Foundry, 225x120 feet.
Machine shop, 225x120 feet.
Power plant, 156x56 feet.
Forge shop, 100x50 feet.
Store house, 60x60 feet.
Oil house, 60x30 feet.
Laboratory, 35x45 feet.

A number of brick houses and offices have been built, and it is the policy of the company to build an additional number of houses in order to have their employes in close proximity to the plant. A large number of tenement houses have also been built to provide dwellings for the laborers required in the plant.

The capacity of the works is estimated at 128,000 tons of steel per annum, although it must be borne in mind that the different items noted below will vary according to the conditions of the market, and that the output of any of the departments can be increased or diminished as conditions may warrant. Capacity per annum:

Rails	40,000 Tons.
Beams and shapes	40,000 Tons.
Billets and bars	10,000 Tons.
Pig iron	30,000 Tons.
Castings	8,000 Tons.
Total	128,000 Tons.

The mills are constructed to make a much larger tonnage than the above and with continuous operation and some expansion can take care of the output of four blast furnaces, although only one is under erection at the present time. Plans have been prepared for the erection of three additional furnaces as soon as the demand requires the increase in capacity. In the accompanying plan of the works it will be seen that four blast furnaces are located, although work has only been commenced on Furnace A. The furnace is 18x80 feet and will be equipped with four Massicks & Crooke hot blast stoves 19 feet 6 inches by 75 feet. They are being erected by G. W. McClure, Son & Co. of Pittsburg. Steam will be supplied by six Babcock & Wilcox boilers in batteries of 680-h. p. each. The blast will be furnished by two pairs of vertical, compound condensing blowing engines, built by the William Tod Co. of Youngstown, O. The blowing cylinders are 84 inches by 60-inch stroke. The steam cylinders are 42 inches and 80 inches, respectively. Arrangements have been made to carry the molten metal directly from the furnace to the open-hearth furnaces. The capacity of the blast furnace will be about 350 tons per day.

At the present time three 35-ton open-hearth furnaces are under erection, with room provided for two additional 50-ton furnaces. These are commanded by a 50-ton electric traveling crane built by the Morgan Engineering Co. of Alliance, O. An electric charging machine is also provided to charge scrap and cold pig iron. It is the intention to cast the product of the furnaces directly into molds for use in other departments of the plant. The decision to confine the product of the works to open-hearth steel was due to the fact that the market required such a range of material that it was thought that open-hearth steel best fulfilled all the conditions; but in the plans room was provided so that in case a Bessemer plant may be desired in the future to supply steel for a very large product of rails this can be readily done without any disarrangement of the present plant.

Three soaking pit furnaces have been provided with a capacity of 12 ingots each. The ingots are handled by a Morgan electric charging crane. The lids of the furnaces are operated by hydraulic power, as are the ingot strippers. On being taken from the soaking pits the ingots are placed on a tilting car and are delivered on the table of the blooming mill. The blooming mill is two-high, with rolls 40 inches in diameter by 103 inches in length, driven by a pair of 40-inch by 60-inch reversing engines, built by the Wm. Tod Co. of Youngstown, O. The engines are geared one to two with cut steel gears. The top roll is moved by an engine placed on the top of the housings, which operates the housing screws by means of cut worm and gear. The top roll and spindles are balanced by hydraulic pressure. The blooming mill is provided with tables on both sides and has two manipulators, which permit the turning and handling of the bloom. The tables are of such length as to permit the rolling of from 75 to 90 foot length.

An extension of the blooming mill table on the catcher's side brings the product of the blooming mill to a powerful hydraulic shear, which is designed to cut blooms up to 200 square inches, or 20 inches by 10 inches. This shear is so designed that the water consumed will be according to the work performed. To cut small pieces, such as slabs for plate mill and billets for the merchant mill, room is provided for a power shear.

From the shear the product goes either directly to the roughing mill, or if required to be heated is sent to the Siemens re-heating furnaces, where the blooms are charged and taken out by two Collins patent charging and drawing machines. These charging machines are operated by electric motors and were built by the Morgan Engineering Co. The roughing mill is two-high, with rolls 32 inches by 78 inches. They are driven by a pair of reversing engines, 36 by 48, built by the Wm. Tod Co. These engines are geared 5 to 7, with cut steel gear. The mill is built on the same plan as a blooming mill and is provided with the same operating and balancing arrangement. Tables and manipulators are also provided for this mill. A portion of the product can be finished here but the bulk will go to the finishing mill.

The finishing mill is three-high, reversing, with rolls 28 inches by 66 inches, and is driven by a pair of reversing engines built by the Wm. Tod Co. The engines are geared one to one with cut steel gear. The mill has three stands of rolls, movable tables running along the entire length of the train, and allows the bringing of the steel to or from any of the three sets of rolls. This arrangement allows a wide range of products, as any set can finish. The front part of these tables operates on a hinge, to permit a piece to be transferred from one pass to another. This mill will finish rails from 35 to 100 pounds to the yard, and will finish beams and channels from 4 inches to 24 inches. It is also designed to roll Z bars, Tees, angles, railroad ties, tie plates, rounds and squares. This mill will roll material above four inches, and for rolling smaller material, merchant mills are contemplated.

From the finishing mill the material is delivered to a run-out, which brings it to a hot saw, where the product is cut to the desired lengths. A continuation of the run-out brings the material to the cooling beds. In the case of rails these pass through a cambering machine before reaching the cooling beds. From the cooling beds the material is handled by drags, and is delivered to the straightening machines, shears, drills and such other machinery as may be required to put the material in marketable condition. All of the finishing machinery is placed in a special building and is operated by electric motors. After being finished the material is loaded directly into cars. For beams and shapes large beds are provided to cut and shape as required by specifications.

Each roll train is provided with an electric traveling crane, built by the Niles-Bement-Pond Co. These cranes are designed to facilitate the handling of heavy parts, and especially the changing of rolls. In the case of the finishing mill the crane is of 60 tons capacity, and is able to lift each stand of rolls, including the housings, and replace the same by another stand. By the use of this large crane the time of changing rolls is reduced to fifteen or twenty minutes. In the blooming and roughing mills 20-ton cranes are provided sufficiently powerful to lift one roll at a time. As these rolls are only changed in case of accident or when worn, it is not so necessary to change the rolls so expeditiously. To supply gas to the open-hearth plant, soaking pits and reheating furnaces, sixteen 10-foot Talbot producers have been provided, and are connected by underground flues with the furnaces.

The foundry is situated parallel to the mills and is of steel and brick construction. It is 225 feet in length, the central span being 60 feet wide, with two bays of 30 feet each. It contains two 72-inch cupolas and one small cupola for melting brass and bronze. For melting special iron for strong castings an 18-ton air furnace is provided. In addition the foundry contains four core ovens and a complete equipment of machinery for mixing and sifting sand, and cleaning castings. The foundry is commanded by two electric traveling cranes, one of 30 tons and the other of 15 tons capacity, built by the Niles-Bement-Pond Co. The capacity of the foundry is about 30 tons per day and it is intended to do all classes of work, from the smallest castings to those weighing 30 tons or more.

The machine shop is also parallel to the mill building and is of brick and steel construction and of the same dimensions as the foundry. It is equipped with two Niles electric traveling cranes of 30 and 15 tons capacity, respectively. The large equipment of the shop consists of the following tools: one 96x96-inch Niles planer, one 54x54-inch Pond planer, one 84-inch Pond boring mill, one 51-inch Niles boring mill, one 18-inch Niles slotter, one 60-inch Niles engine lathe, one 48-inch Niles engine lathe, one 32-inch Niles engine lathe, two 40-inch Frank-Kneeland roll lathes and two 60-inch lathes of the same make. In addition the shop is equipped with a large number of small lathes, slotters, bolt cutters, pipe machines and a full equipment of machine-shop appliances. With the exception of the roll lathes, which are

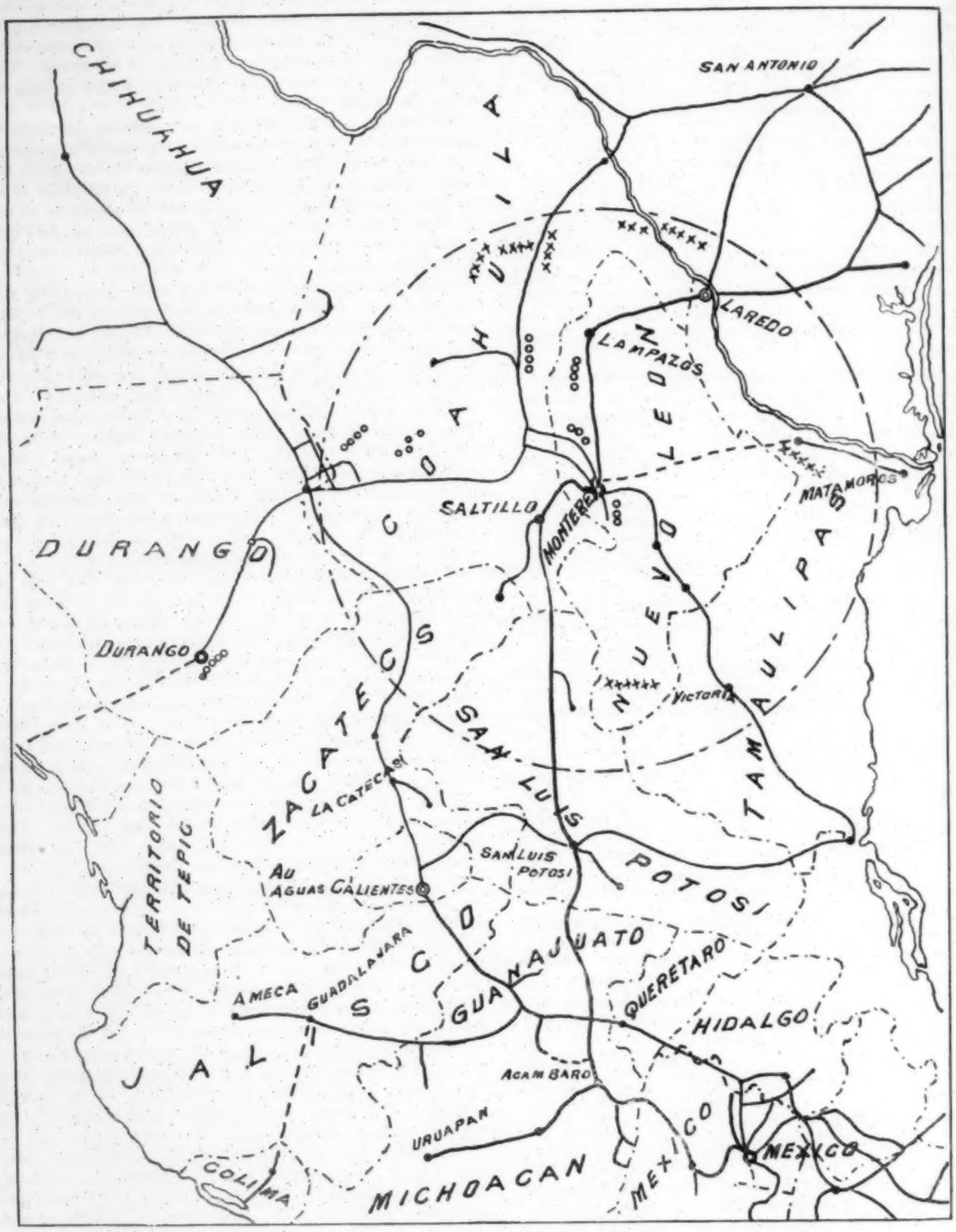


FIG. 2.—MAP SHOWING IRON AND COAL DISTRICT TRIBUTARY TO MONTERREY, MEX.; ALSO RAILROAD AND WATER COMMUNICATION.
xxxxx Coal deposits ooooo Iron Ore deposits.

driven by an independent electric motor, the tools are placed in groups and each group is driven by a separate motor. A part of the shop is partitioned off and serves as a tool room, and another part of the shop at present serves as a pattern shop and is provided with wood working machinery. The machine shop is not only equipped to do the machine work for the plant but also designed to do machine work of all kinds for the various railroads and smelting and manufacturing plants located in the vicinity of Monterey.

The forge shop is of brick and steel construction and is 50x100 feet. It is located within easy reach of both the foundry and machine shop. It contains two steam hammers, nut and bolt machinery and ten forges. The power required to operate this plant is provided by a 25-h. p. General Electric motor.

To provide power to the traveling cranes, tools and implements in the different portions of the plant, a central power station has been erected. The building is of steel and brick and is 56x150 feet. It contains two Harrisburg tandem compound engines 17x27x16 inches, each directly connected to a 150-kilowatt General Electric generator. Steam for the plant is provided by two Babcock & Wilcox boilers of 250-h. p. each.

The store house is a brick and steel building with an iron roof 60x60 feet. The oil house is also of brick with an iron roof as a precaution against fire.

The water supply is obtained from a large reservoir located east of the plant, which also supplies water to the city of Monterey. From the reservoir the water is carried through a sewer to a well near the blowing engine house of the blast furnace. Two powerful pumps of 2,500,000 gallons capacity each per day lift the water to a stand pipe, from which point it is distributed under pressure to the blast furnace and mills. The waste water from the blast furnace is carried back to the reservoir through an open ditch, and the large surface of the reservoir allows it to cool to the desired temperature for renewed use. To provide the necessary pressure for the hydraulic machinery a special pressure plant has been designed and will be located between the roughing and finishing mills.

A terminal has been located, to and from which connection is made with all the railroads entering Monterey. Great care has been taken in arranging the track system in order to facilitate the delivery of the coal, coke and ore, and for the shipment of the product from the works.

A structural shop for the building of buildings and bridges, merchant mills, wire mill and plate mills are contemplated improvements that will be made in the near future.

William White Jr. of Pittsburg, with offices in the Empire Building, is consulting and designing engineer for the company.

DIRECT METAL FOR CASTINGS.

An article on the use of metal direct from the blast furnace for castings was reprinted in our issue of Nov. 7. As a comment on the proposition, which appears in technical press now and again, we have the following from Thomas D. West—an advance proof of a portion of his revision of the "Metallurgy of Cast Iron," now in press:

"In the first days of founding, castings were made from metal taken directly from the furnace making the iron. The difficulty and uncertainty of obtaining the grade of iron desired and the fluidity necessary to insure good work, as well as the advantage of having metal at the time best suited to the founder's needs, gave rise to the cupola to remelt iron. Had the furnace advanced anywhere near the degree in assuring a uniformity of 'grade' that it has in increasing its output, many more castings would now be made direct from furnace iron. While some may question the ability of the furnace ever to achieve any better results in uniformity of product, competition may strongly influence an effort for improvement in this direction. Aside from the above evil is the trouble caused by the 'kish' found with some metals that throw out graphite excessively. Often after a furnace 'cast' of foundry or Bessemer iron the floor of the house will be covered with 'kish,' which resembles in appearance flakes of silver, lead or plumbago, like the flakes of carbon so often found between grains of pig metal and castings. It can be removed from fractures by means of a stiff brush or rubbing.

"The evils to be expected from metal possessing much 'kish' are mainly in 'cold shuts,' spongy, porous spots in castings, or the separation of the grains of the metal at places where 'kish' is confined. One might as well try to make a union of oil and water as of kish and cast iron. Were it possible to collect or skim off all the 'kish' created on top of direct metal, little damage might be expected; but this is not practical, as the 'kish' keeps rising to the surface as long as the metal is in a fairly fluid condition. Appliances have been invented with a view to collect the 'kish' in pouring runners, etc., before the metal would enter the molds, but these have proven of little value. It may be said that metal possessing much 'kish' is unfit for pouring castings.

"Direct metal free of 'kish' can make very good castings, and for some classes of work might often prove more desirable than cupola iron, as less sulphur can be obtained in direct metal than with iron remelted. Iron cannot be remelted in the cupola, with coke or coal, without increasing its sulphur from .02 to .06 per cent. The remelting of pig metal entirely destroys the 'kish' that appears in direct metal. The life and fluidity of direct metal, compared to cupola iron, will be questioned by some. If a furnace is working properly, its product will compare very favorably as regards these qualities with cupola iron. The author has seen hotter iron from a furnace than is generally obtained from cupolas, and iron that held its life or fluidity exceptionally long. In fact, the author is of the opinion that direct metal can have such an initial heat imparted to it as to create a much more fluid metal than can be obtained in remelted iron.

"To utilize direct metal some have thought it would be a good plan, in order to overcome the difficulty from 'kish' and obtain a more uniform product, to first pour the metal coming from two or more furnaces into a large receiver or reservoir so arranged as to closely confine from 50 to 100 tons of iron, one idea being that if the metal should have 'kish' in one furnace, and another would be free of it to mix with it, and hence an average could be obtained which would be sufficiently free from 'kish' to obviate any defects in the casting. The information which the writer has obtained as to the success of this plan is not very favorable. The difficulty found consisted in the metal losing too much fluidity and life by the extra handling and detention of the metal in the fluid state. Where work is very massive, not requiring good hot iron, this reservoir method may be of much value; but the difference which exists in the cost of direct metal and cupola iron does not warrant any very great chances of losing castings on account of the fluidity and uniformity of a 'grade' not being as desired. However, for castings like ingot molds and pipe 'direct metal' in days of close margins may command attention in some cases.

"It is no uncommon thing for us in our foundry to make small castings with direct metal carried by three men in a bull ladle from a furnace close by us. The plan which we adopt to obtain such small bodies of metal is simply to catch the metal with a 'hand ladle' by dipping the iron out of the main runner as it flows to the pigs and pouring it into a 'bull ladle.' We have made very good castings by this plan. We have also taken 'direct metal' in crane ladles by having a car run on a track sunk sufficiently below the main runner to receive the metal from a branch runner extending beyond the casting house. With iron containing silicon under 1.00, manganese, up to 1.00, the higher the better, and sulphur above .03 it is rare that any kish is seen, and when such direct metal can be obtained very good castings may be produced. Of course, with a low silicon and high sulphur iron it is not to be expected that any work less than half an inch thick, requiring any fine finishing in the machine shop, can be satisfactorily obtained, but for bodies over the above thickness very little trouble should be experienced, as long as the metal does not get over one per cent in silicon and keeps under .03 in sulphur. It is the changeable percentage of silicon and sulphur which, as a rule, alters the grade in the product of a furnace when running on one kind of ore flux and fuel. Late improvements and a better understanding of furnace work are doing much to lessen irregularity in the percentages of silicon and sulphur. In fact, some furnacemen have so mastered the art of making iron that they can run weeks at a time without varying 30 per cent in silicon or three points in sulphur, when making iron having less than 1.25 silicon. It is with silicon above 1.50 per cent—also in very hot weather—that the greatest difficulty is experienced at present in regularly obtaining a uniform grade of direct iron or of pig metal."

NEW PROCESS OF TREATING STEEL RAILS OR BEAMS.

The present process of rolling rails is to heat an ingot to a high temperature and then run it through breaking-down rolls, giving it about four passes, from thence it is passed to the finishing rolls. The method is at once straightforward and cheap, but the porous structure of the finished rail is a matter of serious consequence in respect to wearing qualities. This condition arises from the rolling of the rail at a very high temperature and then allowing the metal to cool undisturbed. Another disturbing factor is introduced from the unequal cooling between the two halves of the rail; the head being so much heavier than the thin web that irregular and weakening strains are impressed upon the material. The rapid rolling does not allow sufficient time for the scales to drop clear of the rail and these are carried between the rolls and pressed into the wearing surface. What has been done at Edgar Thomson to remedy the unequal cooling of head and web has been told and illustrated in these columns.

A recent invention is intended to avoid the troubles mentioned and increase the effective life of the rails by decreasing the porosity and grain of the material, lessening the initial strains and removing the scale. The new process is the invention of William E. Coyan, of Homestead, Pa., and is illustrated in Fig. 1. In the upper part of this illustration is an

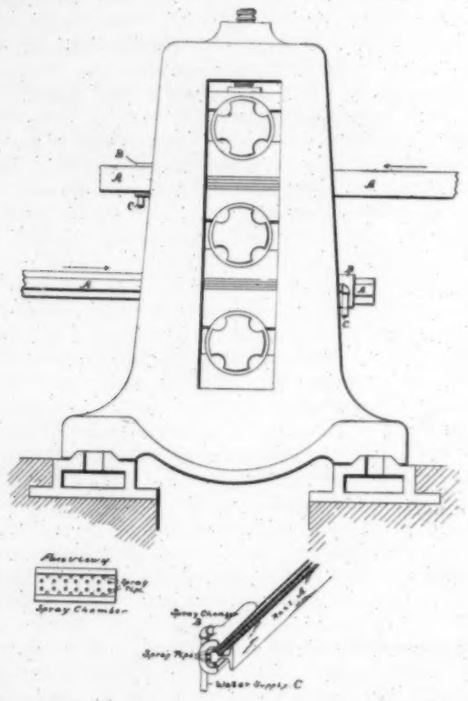


FIG. 1.—NEW PROCESS OF TREATING STEEL RAILS OR BEAMS

end elevation of a set of rolls equipped with this improvement. The lower views are detail drawings of a spray chamber. In carrying out the process a heated ingot out of which a rail is to be formed is taken from the breaking-down rolls and passed through the first set of grooves on the lower finishing rolls. The partially finished rail A is then passed back through the first set of grooves on the upper finishing rolls and water or oil is then applied by a spray or jet from the hollow chamber B, fed by the supply pipe C, against the head of the rail. The application of water or oil partially chills the head and loosens the scale, and the stored heat will then run quickly out to the face and draw the temper. The still unfinished rail is then repassed through the second set of grooves in the lower finishing rolls, reducing the area and breaking off the scale. During this pass the oil or other cooling medium is again applied and the temper is subsequently drawn by the heat running out to the tread of the rail as in the previous case. The rail is subjected to a like operation in the second set of grooves on the upper rolls and finally a pass is made through the third set of grooves on the lower rolls and the head of the rail cooled more severely than before, after which the rail is carried away and left to cool.

Mention is made of water and oil for cooling, but it is obvious that any other medium could be employed which would enable one to quickly cool the face below the temperature of the web for the alternate cooling and drawing of the temper between the passes through the rolls; in this connection compressed air might be mentioned as giving some of the advantages resulting from the use of water, oil or brine.

The inventor sums up the advantages of his process as follows: The scale is removed from the rail and the working of it into the face is prevented. The head is alternately cooled, heated, and reduced, which give all the beneficial results of reheating and working the steel as well as decreasing the temperature at which it is worked and finished. The temperature of the head of the rail is decreased and strains prevented during the final process of cooling. He further suggests that its introduction entails no change in the construction of the rolls, no extra labor for the workmen, no change in the composition of the steel, no loss of time and that the steel is never reduced to a temperature low enough to cause any unusual strain on the rolls or require extra power to run them. The process is equally applicable to girders having light webs and heavy heads or flanged parts.

SUGGESTED AT THE SHOP.

BY F. O. REMAN.

I see that some experts have given their opinions on the main factor in machine shop progress and it is highly interesting reading. Expert testimony is apt to run in grooves parallel to the special line of the individual experience, and the experience of the one individual depends so much upon his particular training that it is usually unique. To get the proper perspective it is essential that the man keep to the things he has seen for himself and not depend altogether upon the vision of the other fellow. It is this very thing that gives the opinions quoted in *The Iron Trade Review* last week a more than common interest. They are altogether different from what the result would have been if they had been watered down to a weak suggestion of the general belief.

* * * * *

An ordinary, every-day shop man is not in the same class with these exponents of up-to-date machinery manufacture and I refrain from criticism. It is in order, perhaps, that I suggest one or two things that occur to mind on reading the aforesaid special issue: I don't know who invented the limit gauge, but I miss my guess if he does not deserve some mention as a factor in machine shop progress. To bore a hole in a casting and then fit a number of shafts to it is one way of making a shop standard. It won't last long, but it is serviceable within certain limitations. The usefulness of the scheme will be increased if the hole is put through a piece of steel, the gauge hardened and then lapped out to size. The hole may be one inch in diameter, but that does not say that the shafts passed through the hole are to any exact size. That depends upon the machinist and his sense of fitness.

* * * * *

If two holes had been made of slightly different diameters then the shaft that passed through one and was too large for the other would of course be some size between the two. The difference between the two holes may be very small, but it is just as effective a solution of the problem, and the shaft, stud, or whatever it may be, is held down to set limits. Some men have a close appreciation for the fit of one piece of metal to another and yet they will fall down on a question of the appropriate time limit. To know when a job is good enough for the purpose and to stop then and there is an even more valuable qualification than the ability to do a more elaborate job than the employer can afford. The limit gauge gives the amount of leeway there is on the job and the workman does not have to guess long on which edge of that narrow strip he stands between the fit and the failure.

* * * * *

The whole interchangeable system seems to me to depend entirely upon this limit gauge scheme. A man in one part of a factory can make a piece to size and need never see the part it is to fit, and therefore the manufacturer of machinery is

indebted to the limit gauge as the main factor in determining the allowable inaccuracy. It says plainly when the large shaft will not be too tight or the small shaft too easy a fit at that final stage when the parts are to be assembled at random. Human nature has its faults and the limit gauge follows up the unavoidable inaccuracy and keeps it within bounds.

* * * * *

The limit gauge has been improved by making the two ends of different lengtns on the wearing surfaces. The part that gets most wear is made long and has thus a greater usefulness and is more convenient than the old plan of relying upon the figures stamped on the two ends. The gauge was likely to be laid down and accidentally reversed, with annoying results to the mistaken machinist. In the hurry he was liable to jump at the conclusion that the north end was the one pointing to the south and this error, on account of the minute distinction between the two ends, was possible with the industrious workman. The different size of the two ends of the common limit gauge is now a constant reminder.

* * * * *

It seems probable that the press will be used occasionally as a preliminary to the work of the screw machine. The slicing up of material by cutting tools is not so economical in stock as the pressing of the same thing into shape. I have seen some blanks which were struck up in a press and then fed in a magazine to a screw machine for the threading operation. These were sent from Germany and the screw machines are being equipped here for export to that country. Wood screws are made on that principle, but that is a matter where uniform sizes permit a condition of affairs that the average machine shop does not get.

* * * * *

The press has got into the molding shop in the same way in which it is after the machinist. I have seen some small gears and other parts for cash registers, typewriters, etc., which strike me as one of the slickest things I have met. The metal is forced into a die or mold and comes out clean cut and perfect as a machine could carve it. The last word has not been said on metal-working processes by any means and there is an incentive to the development of schemes for the saving of time and material, provided the outlay does not cost too much.

TRADE PUBLICATIONS.

The telegraphic code of the Champion Rivet Co., Cleveland, has been adapted from the universal edition of the standard publication issued by the Western Union Telegraph Co. The code is arranged in a compact form for ready reference and treats exhaustively the numerous variations in rivet dimensions. A useful list of code words for orders, prices, terms and shipments is included.

A circular in reference to the Forskell speedometer has been issued by the Forskell Motor Co., Anderson, Ind. The speedometer is an ingenious instrument for application to street cars, automobiles and other road vehicles; it indicates the speed in miles per hour at which the conveyance is traveling. The dial constantly shows the rate of progression.

The Balkwill Pattern Works, Cleveland, is sending out some calendar blotters. These bear an ornamental design quaintly illustrative of the patternmaker's handicraft. The company is now located in its new building on Hamilton St., and in a better position to handle a very large amount of work.

"Three Hydraulics" is the title of a little pamphlet descriptive of the Clow water elevators, the Clow pressure regulators and the Erwin steam rams manufactured by James B. Clow & Sons, Chicago, and New York. The water elevator is a pump operated entirely by water power and is used to pump water from cisterns and increase the elevation of water from city mains. The water pressure regulator is a simple device for regulating water pressure where it is frequently or constantly raised to a high pressure, as for fire purposes. The steam rams have capacities from 400 to 8,000 gallons per hour and the standard type, on a direct vertical lift with dry steam at about 75 pounds pressure, will, it is claimed, force water up to a height of 80 or 90 feet above the ram itself. The ram is illustrated in detail and a number of tests and testimonials are given.

The Electric Controller & Supply Co., Cleveland, is sending out a catalogue detailing the merits and construction of a flexible metallic tubing. The tube is constructed from a metallic tape which is rolled up in a spiral form so that the edges overlap and fit into each other tightly without prejudice to their power of motion. The rolled tape forms a groove for the reception of a packing which is completely enclosed in the metal where it remains fully protected from internal or external wear and tear. The tubing is made in various sizes and adapted to meet the requirements of steam pressures from 250 to 350 pounds; special qualities are manufactured for extremely high service, up to 2,000 pounds per square inch, for use in connection with hydraulics.

A 48-page catalogue contains a selection from the long list of tools and shop supplies manufactured by Charles H. Besly & Co., 10-12 North Canal St., Chicago. The Gardner grinders, Besly band grinders, pneumatic polishing wheels and spiral grinding circles are freely discussed and illustrated with the other specialties in babbitt, bronze, spring material, oil cups, taps, wrenches, die stocks, lathe dogs and parallel clamps, handled by this company.

The Victor Cooling Tower Co., St. Louis, Mo., has published catalogue 11, treating upon its water-cooling apparatus. The interior of the fan tower is constructed of metal plates, perforated and set at an angle, to distribute the water evenly, thus offering a large water surface to the upward action of the air. It is claimed that by the use of the Victor cooling tower in connection with a jet, surface, or central jet condenser, a steam plant may be operated condensing without using any more water than would be necessary in operating it as a non-condensing plant, producing a vacuum of from 23 inches to 27 inches and effecting a saving of from 15 per cent to 30 per cent in fuel.

The merits of the Monarch coupler are exploited in a recent catalogue issued by the Michigan Malleable Iron Co., Detroit, Mich. The appliance is illustrated with half tones and line drawings and the several advantages of the improved construction are set forth with considerable detail.

Circular No. 65 is devoted to the line of mortar and concrete mixing machinery manufactured by the Jeffrey Mfg. Co., Columbus, O. These are constructed in various sizes, portable or stationary, horse or power driven. The machine is built upon the same general lines for mixing mortar or concrete; when used for the latter material the conveyor box is heavily lined with sheet steel; in either case the material is thoroughly mixed and in that condition the brick masons can accomplish more work than when ordinary hand-made mortar is used.

The Wagner Mfg. Co. of Sidney, O., has issued catalogue No. 10, a 72-page publication descriptive of their extensive line of hollow ware. The company makes a specialty of the manufacture of cooking utensils in cast aluminum and iron. The increasing demand for this line of goods has called for the construction of two new buildings; one especially for the manufacturing of aluminum articles, the other contains a large and commodious office. The catalogue also contains prices and full particulars of furnace doors, grate bars, mauls, cistern rings and covers, hitching posts and weights, gas burners, tuyere irons, etc. A medal and diploma has been awarded the Wagner specialties by the Pan-American Exposition authorities at Buffalo.

Dean Bros.' "economic" vertical double-acting air pump and condenser is the subject of a finely illustrated circular published by the Dean Bros.' Steam Pump Works, Indianapolis, Ind. The circular has a number of half tones and brief descriptive matter in reference to independent apparatus for condensing engines.

The United Boiler Co., Girard, O., has placed an order with J. T. Ryerson & Son, Chicago, Ill., for a Lennox bevel and rotary splitting shear for its plant which is being enlarged.

The Tennessee Coal, Iron & Railroad Co. will shortly erect a hop and cotton tie mill at Ensley, Ala. Plans for the same are now being prepared.

National Founders' Association at New York.

The fifth convention of the National Founders' Association held at the Gilsey House, New York, was full of evidences of the seasoning and strengthening that time brings to men and organizations. There was in all the deliberation and action of the convention a confidence and a strength of purpose that come only from successfully wrestling with practical problems. In spite of the disturbing conditions of the past year the association showed a gain in membership. Some members were lost, a few from the pressure of conflict and more from receiverships and changes of firm, but the new members more than compensated for the losses.

The cumulative effect of strong leadership was apparent in the New York convention. It would be difficult to find in the foundry industry, or any other, four men of larger measure or of better adaptation to formative work than Wm. H. Pfahler, P. W. Gates, O. P. Letchworth and H. W. Hoyt. To the writer as an onlooker it is evident that the leaders of the National Founders' Association in these first years have built even more wisely than they knew. All have been consistent advocates of conciliation in dealing with employes or with representatives of employes' organizations. Not the mere opposing of force with force, but the establishment of a just and stable basis that will look toward peace rather than conflict between proprietors and wage-earners, and make the settlement of future differences easier—has been the aim. That the union has decreed it or has always contended for it, is not sufficient sanction of a practice or policy, on the one hand, nor on the other hand does the National Founders' Association stand for antagonism to unionism. To judge from the discussions at its conventions, and notably those at last week's meeting in New York, it is opposed to artificial restrictions upon high industrial attainment and insistent upon every right the Federal constitution asserts for American citizens, whether employers or employes, not omitting the right of both to organize. That it is strenuously opposed to some of the things done in the name of unionism—even some of the things which unionism in some places and at some times stands for—is evident from its history as well as its debates. Some of these things, it may be added, will not appear as features of the unionism of the future, for with them unionism cannot survive.

Those in Attendance.

The register of the Gilsey House convention showed most of the leaders in previous conventions present, though some familiar faces were missed. On the other hand a number of comparatively new men were in evidence, some of whom already give promise of future prominence. The enrollment was as follows:

H. W. Hoyt, president, Allis-Chalmers Co., Chicago.
Antonio C. Pessano, vice-president, Geo. V. Cresson Co., Philadelphia.
John R. Russel, treasurer, Russel Wheel & Foundry Co., Detroit.
H. N. Covell, Lidgerwood Mfg. Co., Brooklyn.
G. E. Emmons, Edison General Electric Co., Schenectady, N. Y.
I. W. Frank, Frank-Kneeland Machine Co., Pittsburg.
Nath'l French, Bettendorf Metal Wheel Co., Davenport, Ia.
Jos. A. Stone, Riverside Foundry Co., Cleveland.
Geo. Q. Thornton, Carondelet Foundry Co., St. Louis.
F. T. Towne, Yale & Towne Mfg. Co., Stamford.
W. H. Pfahler, Abram Cox Stove Co., Philadelphia.
Willis Brown, Walker Foundry Co., Erie, Pa.
John A. Rathbone, U. S. Heater Co., Detroit.
Geo. H. Lincoln, Geo. H. Lincoln & Co., Boston.
E. H. Walker, J. I. Case Threshing Machine Co., Racine.
P. W. Gates, Allis-Chalmers Co., Chicago.
W. D. Sargent, Sargent Co., Chicago.
Ellis L. Rowe, Rensselaer Mfg. Co., Troy.
Jas. McKown, Josiah Anstice & Co., Rochester.
G. T. Bliss, Erie City Iron Works, Erie.
Walter Perry, Farrel Foundry & Machine Co., Ansonia, Conn.
W. A. Jones, W. A. Jones Foundry & Machine Co., Chicago.
R. J. Cleveland, Cleveland & Barr, Chicago.
John Ramsay, John Ramsay & Co., Chicago.
Lincoln Haney, Globe Foundry, Cincinnati.
C. A. G. Winther, Chapman Valve Mfg. Co., Indian Orchard, Mass.
H. K. McLean, Link-Belt Machinery Co., Chicago.
James E. Hunter, James Hunter Machine Co., Boston.
Edwin Maher, Maher & Flockhart, Newark.
Allen Ames, Ames Iron Works, Oswego.
W. S. McMullan, Richmond Stove Co., Norwich, Conn.
O. P. Letchworth, Pratt & Letchworth Co., Buffalo.
L. D. Collins, Johnston Harvester Co., Batavia.
Edgar McDougall, Jno. McDougall, Montreal, Que.
John M. Taylor, Dominion Radiator Co., Toronto, Ont.
R. L. Ireland, American Ship Building Co., Cleveland.
Alex. Adams, St. Paul Foundry Co., St. Paul.
Stuart R. Carr, Stuart R. Carr Co., Baltimore.
Jas. E. Orme, Henry Orme, St. Paul.
W. S. Douglas, Wm. Tod Co., Youngstown, O.
Philip Medart, Medart Patent Pulley Co., St. Louis.
D. J. Matlack, Wm. Cramp & Sons, Ship & Engine Bldg. Co., Philadelphia.
Elmer H. Dearth, Diamond Iron Works, Minneapolis.
Oliver Crosby, American Hoist & Derrick Co., St. Paul.
A. Winger, Superior Drill Co., Springfield, O.
H. R. Micks, Rumsey & Co., Ltd., Seneca Falls.
Alex. Jarecki, Jarecki Mfg. Co., Erie, Pa.
P. Kennedy, P. Kennedy Foundry, Baltimore.
F. B. Farnsworth, McLagon Foundry Co., New Haven.
E. E. Durant, The George F. Warner Mfg. Co., New Haven.
C. W. Davenport, National Foundry, Erie, Pa.
F. A. Ingalls, Buda Foundry & Mfg. Co., Harvey, Ill.
M. F. Moore, Marine Engine Machine Co., Harrison, N. J.
Walter H. Laurie, Laurie Engine Co., Montreal.
R. C. Schenck, Dayton Malleable Iron Co., Dayton, O.
Robt. H. Foos, Foos Mfg. Co., Springfield, O.
J. S. Sterling, Harlan & Hollingsworth Co., Wilmington.
Geo. A. Swartwout, Peru Steel Castings Co., Peru, Ind.
W. W. Cheney, S. Cheney & Son, Manlius, N. Y.
Wm. P. Allen, Wm. Allen & Son, Worcester, Mass.
Asa S. Bushnell, Warder, Bushnell & Glessner Co., Springfield, O.
Chas. L. Bauer, Warder, Bushnell & Glessner Co., Springfield, O.
Wm. B. Smith, Smith & Caffrey, Syracuse.
Geo. L. Hopping, Tarrant Foundry Co., Chicago.
Albert Hoppin, Allis-Chalmers Co., Buffalo.
Wm. R. Brown, Brown-Ketcham Iron Works, Indianapolis.
Geo. T. Brown, Brown Cotton Gin Co., New London, Conn.
H. M. Wallis, J. I. Case Plow Works, Racine, Wis.
R. C. Oliphant, Trenton Malleable Iron Co., Trenton.
Wm. M. Taylor, Chandler & Taylor Co., Indianapolis.
Matthew Griswold, Griswold Mfg. Co., Erie, Pa.
Matthew Griswold jr., Griswold Mfg. Co., Erie, Pa.
Alex. I. Lewis, Michigan Brass & Iron Works, Detroit.
R. D. Reed, H. B. Smith Co., Westfield, Mass.
E. M. Walker, Chas. Parker Co., Meriden, Conn.
Sam'l A. Kensie, Tioga Foundry Co., Philadelphia.
Jacob B. Blankley, Tioga Foundry Co., Philadelphia.
Wm. Butterworth, Deere & Co., Moline, Ill.
H. F. Wanning, Birmingham Iron Foundry, Derby, Conn.
W. L. Herendeen, Herendeen Mfg. Co., Geneva, N. Y.
C. D. Palmiter, Watertown Engine Co., Watertown.
J. Sellers Bancroft, Wm. Sellers & Co., Philadelphia.
F. A. Strong, Eaton, Cole & Burnham Co., Bridgeport, Conn.
H. M. Leland, Leland & Faulconer Mfg. Co., Detroit.
Jno. McLaren, Phillips & McLaren, Pittsburg.
Geo. T. Marsh, So. Baltimore Foundry, Baltimore.
W. R. McClave, McClave, Brooks & Co., Scranton, Pa.
Geo. S. Rominger, Girard Iron Works, Philadelphia.
Arthur E. Barlow, Arthur E. Barlow, Newark.
F. V. Bartlett, Pratt & Whitney Co., Hartford.
J. H. Whiting, Whiting Foundry Equipment Co., Harvey, Ill.
Wm. J. Carlins, Thos. Carlins Sons Co., Allegheny, Pa.
Geo. H. Gibby, Condor Iron Foundry Co., Boston.
Otis H. Cutler, Ramapo Foundry Co., Rahway, N. J.
S. J. Meeker and J. M. Cory, S. J. Meeker, Newark, N. J.
Thos. Devlin, Thos. Devlin & Co., Philadelphia.
D. J. Kilby, Kilby Mfg. Co., Cleveland, O.
Carl Horix, Geo. B. Sennett Co., Youngstown.
H. J. Boggis, Taylor & Boggis Foundry Co., Cleveland.
M. E. Kennedy, Kennedy Valve Mfg. Co., Coxsackie, N. Y.
F. H. Fairweather, Kennedy Valve Mfg. Co., Coxsackie, N. Y.
Chas. Patterson, Patterson Foundry Co., Cleveland.
Chas. A. Patterson, Patterson Foundry Co., Cleveland.
J. H. Webster, Variety Iron Works Co., Cleveland.
G. A. Watts, Watts-Campbell Co., Newark.
Jas. R. Sutliff, Foster, Merriam & Co., Meriden, Conn.
Douglas G. Moore, Sam'l L. Moore & Sons Co., Elizabeth.
Oliver Phelps, Lorain Foundry Co., Lorain, O.
H. Van Atta, J. L. Mott Iron Works, New York.
Herbert B. Atha, Benj. Atha Co., Newark.
L. H. Wales, Russell & Erwin Mfg. Co., New Britain, Conn.
Stanley G. Flagg Jr., Stanley G. Flagg & Co., Philadelphia.
H. R. Luther, Barbour-Stockwell Co., Boston.
Fred F. Stockwell, Barbour-Stockwell Co., Boston.
S. Decatur Smith, S. Decatur Smith, Philadelphia.
Henry E. Pridmore, Henry E. Pridmore, Chicago.
T. L. Greenwald, The I. & E. Greenwald Co., Cincinnati.

Daniel A. Waters, Goodell & Waters, Philadelphia.
J. S. Van Cleve, Erie Foundry Co., Erie, Pa.
Samuel J. Watson, Watson Machine Co., Paterson, N. J.
John E. Harbster, Reading Hardware Co., Reading, Pa.
James Eastwood, Benj. Eastwood Co., Paterson, N. J.
W. F. Prince, International Steam Pump Co., Elizabethport.
Wm. Schwanhauser, H. R. Worthington, Brooklyn.
David W. Mesick, Fulton Foundry & Machine Co., Brooklyn, N. Y.
Samuel G. Allen, Franklin Air Compressor Co., Franklin, Pa.
E. R. Harty, Rumsey & Co., Ltd., Seneca Falls, N. Y.
J. G. Aldrich, New England Butt. Co., Providence, R. I.
L. F. Bower, Allis-Chalmers Co., Scranton, Pa.
Geo. H. Graham, Oriskany Malleable Iron Co., Oriskany, N. Y.
Jas. Lanigan, Davis Foundry Co., Lawrence, Mass.
E. Y. Moore, Chisholm & Moore Mfg. Co., Cleveland.
R. H. North, North Bros. Mfg. Co., Philadelphia.
E. A. Pridmore, H. E. Pridmore, Chicago.
David S. Creswell, David S. Creswell, Philadelphia.
D. Lewis Bartlett, Bartlett, Haywood & Co., Baltimore.
Alfred C. Rex, Ferro-Carbon Casting Co., Philadelphia.

Wednesday's Proceedings.

In our issue of last week we gave a synopsis of the report of President Hoyt, which was presented at the morning session of Wednesday. It was a comprehensive document, dealing not only with the questions that had arisen in the year between the Iron Molders' Union and the association, but with the influences at work affecting the conciliation movement in general. On the relations existing between foremen and foundry proprietors the report laid special stress, for experience has demonstrated that the foreman, by tact and alertness may allay friction or by the opposite policy may help minor disagreements to grow into serious trouble. Mr. Hoyt crystallized in his report much of the study and experience of the years he has devoted to the problems of the relation between employer and employe, and the result was a document that will have a prominent place in the archives of the association.

The early portion of the afternoon session of Wednesday was devoted to matters of business. The method of raising money for the general fund and the reserve fund was discussed and a committee of five appointed to consider what changes if any are desirable and to report to the administrative council. In the discussion on this matter one member remarked that the entire cost of the Cleveland strike to his firm was not equal to the loss that would result from a single week's shutdown of their own plant.

A report from the administrative council meeting, which preceded that of the convention, was read. It dealt with the proposal first made in President Hoyt's report at the Niagara Falls meeting and reiterated in his report to this meeting, for a commissioner whose functions should be largely executive, who should have many of the powers now conferred on the president and who should have discretion in many matters now coming up between officers of the Iron Molders' Union and officers of the National Founders' Association. There seemed but one thought in the convention as to the person to be secured for this position, and after the recommendation of the administrative council that a commissioner be elected, the combination of the office with that of secretary was promptly decided upon. This means that the president will not be called upon to the extent that has been common heretofore to handle details of troubles that aise, but the commissioner will be the executive arm of the association to make adjustments, to mediate and often to represent the association in joint conferences.

The discussion of the topical questions suggested by President Hoyt for consideration at the meeting was largely informal, and there was time for the consideration of but a portion of the questions scheduled. On Wednesday afternoon the question "Are agreements of any character with coremakers desirable?" was taken up. H. M. Leland, of Detroit, opened and was followed by H. N. Covell, of Brooklyn, and others. The question was answered for the most part in the negative, though some local agreements with coremakers' organizations are in effect and will doubtless continue in some form.

The question, "Is the molding machine for a complicated class of machinery castings a profitable investment and should it be operated by molders or laborers?" provoked a very interesting exchange of experience. G. E. Emmons, of the General Electric Co., Schenectady, N. Y., gave the results of experience in the Schenectady shops. Between 60 and 70 of the most modern types of molding machines are in use in these shops, and a very noteworthy enlargement of their field has been made so that it now includes castings formerly considered too intricate for machine molding. Messrs. Pessano and Covell, of those listed to speak on this subject, also responded, and were followed by others in a general discussion, which proved very valuable. It was agreed that the progress of the machine has been rapid and some records of performance were given in proof of the ability of nonmolders to become expert in a short time. As to the second part of the question, some qualification of statements was necessary. The value of having molders for pouring certain classes of castings was recognized, but the testimony was rather against giving the machine in charge of the molder with any expectation that he will "develop its best capabilities." Experience thus far has been that handy men make the larger records.

The Banquet.

Wednesday evening was given up to a banquet at the Gilsey House that in its entirety was pronounced the most successful in the association's history. Judge Nathaniel French acted as toastmaster, and in wit and humor and in felicitous introductions proved a capital choice. He pressed into service P. W. Gates, the second president of the association, Wm. H. Pfahler, the first president, being absent, and after Mr. Gates's response ex-President Letchworth was called upon and was likewise well received.

J. H. Webster, of the Variety Iron Works Co., Cleveland, was then introduced and in an eloquent speech expressed the sentiment of the association concerning the work of President Hoyt in their behalf in the past year. To remember in some fitting way the prodigious labors of an eventful year, Mr. Webster presented to Mr. Hoyt, in the name of the entire membership, a silver tea service, massive in design and elaborate in finish. After referring to Mr. Hoyt's early career the speaker said:

"Ere long from a servant he became an employer and as time went on and he slowly but surely gathered and retained within his grasp the fruits of toil, another opportunity brought him and his honest savings within the resistless attraction of that great western metropolis that like the lodestone gathered to itself the brains and energy and wealth of countless victors. Increasing responsibility was but the stimulus for greater effort and deeper study in the serious problem of how to influence others for the right and lead them on to great undertakings.

"To the present record of Chicago's great manufacturing industries I would direct you to find his name upon its first page. And yet while we rejoice with him for all this, still another thought appeals to us tonight. With all these opportunities and labors was another, much the greatest. It was the chance to study one's fellow man, whether the equal in business ability, in social standing, in the polish of liberal education or the poorer creature who for want of all these conditions of life could more powerfully appeal for such consideration.

"Onesimus, a bondman, fleeing from his cruel owner, sought a refuge in Rome beside that consummate man of the world, Saint Paul. Becoming his trusty messenger to the brethren in Christian love, Paul spoke for him when he wrote, 'Masters, give unto your servants that which is just and equal, knowing that ye also have a Master in heaven.'

"If there is any member of this association who from the beginning has sought, in his faith and in his works, by day and by night, in adversity and prosperity to obey this injunction, it is our friend.

"And so a year ago when the work of the elders had to be taken up by another, we turned to him alone to go forward as our leader. It was a tempestuous beginning. Storms have raged and broken, but now the clouds are rolling away and the sunlight of peace and quiet begins to gleam again.

"Such labors cannot be bought or sold. They have no quotation in the markets of this world. Actuated by the highest sense of duty, they can be only requited by that silent appreciation that one great heart bears to another, as was the love of Damon for Pythias. And yet, Henry Warrington Hoyt,

we have sought for you a token that may in the days and nights of the happy future remind you that we loved you for what you were to us and for ours.

"In the reflected light of this little gift we see the frankness of thy purposes, in its purity of refined metal we find thy sincerity, and by its massive and rugged beauty we know thy manly character."

Mr. Hoyt's response was full of feeling and gave evidence of the deep conviction that has inspired his official acts, that a better way is yet to be found for settling the vexing problems of the shop, than strikes and reprisals and selfish struggles for temporary advantage. That co-operation in such a movement begets genuine respect for the men who at great personal loss give their time and strength to the association was strongly testified in this presentation and the reception given the accompanying words.

An interesting bit of by-play at the banquet was the presentation to J. M. Taylor, of Toronto, of a necktie made of rattlesnake skin, and having 12 rattles attached. The gift was guaranteed to be effective against all physical ills, as well as hunger and thirst, and particularly as a cure for a certain mysterious "dark brown taste." Mr. Taylor very happily replied.

The speeches at the banquet were interspersed with vocal and instrumental music and monologue.

Thursday's Sessions.

There were morning and afternoon sessions of the convention on Thursday, and they were given up to the consideration of questions of the most practical character, including issues that have been raised in the past year and others that foundrymen find always with them. For the most part these discussions were of the "good of the order" sort and naturally cannot be given publicity. It may be said that comprehensive plans were laid for the extension of the work of the association and for materially increasing its membership and prestige. It appeared from the discussions that much had been done in the past year and that the association had not only benefited its membership greatly, but had shared its benefits with many foundrymen who have thus far held aloof from the organization, though willing to take advantage of any progress it had made in solving questions of moment to all foundry proprietors. The discussion of the question, "Why is it that the National Founders' Association does not include in its membership every desirable foundry firm in the country?" brought out valuable suggestions looking to a considerable increase in membership. The point came up that numerical gains in membership were not necessarily a sign of increased strength, quality being a very important factor. It was recognized that with increasing numbers come increasing responsibilities for labor troubles, and an increasing risk for concerns whose policy may not be entirely conciliatory.

The consideration of the question of hours of work and wage rates developed considerable variation. In Boston, for example, the 9-hour day has been made an issue and most of the foundries there are working on that basis. Elsewhere there has been no general disposition on the part of the molders to urge a shorter day. The question of wages likewise is still largely a local one. In Chicago the minimum is $2.50 for bench molders and $2.75 for floor molders, though for all-around molders as high as $3.50 is paid for floor work. In New York and Brooklyn molders are averaging $3.10 and $3.15, with higher wages to specially skilled men. In Pittsburg $3 is the minimum, while good machinery molders are getting $3.50 for 9 hours' work.

The discussion on "Injunctions and Their Value" brought out a ringing speech from Judge French, who asserted strongly the right of proprietors to be protected against interference with the operation of their shops and of workmen to the privilege of working without molestation from other workmen who had decreed a state of siege against an establishment whose employ they had left. The law and the equities of the picketing problem were presented in clear and vigorous terms.

Election of Officers.

The concluding business of Thursday afternoon was the report of the nominating committee. In the natural order of things, A. C. Pessano, of Philadelphia, who has been vice-president of the association for the past year, would have been chosen president. Chairman Letchworth, of the nominating committee, said in presenting its report that for business and personal reasons which were imperative Mr. Pessano had declined the tender of the presidency and the committee had been unable to change his determination. The names presented for the various offices were received with strong demonstrations of approval from the convention. In moving the adoption of the committee's report Judge French paid a high tribute to the fidelity of John R. Russel, the association's treasurer, referring in strong terms to the character of his work and to the obligation of the association for such faithfulness and high ability.

Ex-Gov. Bushnell, of Ohio, in seconding the nomination of John A. Penton for commissioner and secretary, referred in well-chosen words to the sacrifices Mr. Penton had made for the cause in which his efforts were enlisted and the debt the foundrymen owed him. In the coming year with the new duties devolving upon him through the commissionership Mr. Penton's sphere of operations will be considerably enlarged. The officers elected are as follows:

President—W. D. Sargent, the Sargent Co., Chicago.

Vice-president—F. T. Towne, Yale & Towne Mfg. Co., Stamford, Conn.

Treasurer—John R. Russel, Russel Wheel & Foundry Co., Detroit, Mich.

Secretary—John A. Penton, Detroit.

DISTRICT COMMITTEES.

First District.—Chairman, C. L. Newcomb, Deane Steam Pump Co., Holyoke, Mass.; vice-chairman, R. D. Reed, the H. B. Smith Co., Westfield, Mass.; Geo. H. Gibby, Condor Iron Foundry Co., Boston, Mass.; F. B. Farnsworth, McLagon Foundry Co., New Haven, Conn.; F. V. Bartlett, Pratt & Whitney Co., Hartford, Conn.

Second District.—Chairman, G. E. Emmons, Edison General Electric Co., Schenectady, N. Y.; vice-chairman, W. L. Herendeen, Herendeen Mfg. Co., Geneva, N. Y.; H. W. Wendt, Buffalo Forge Co., Buffalo, N. Y.; Wm. Schwanhausser, Henry R. Worthington, Brooklyn, N. Y.; R. C. Oliphant, Trenton Malleable Iron Co., Trenton, N. J.

Third District.—Chairman, I. W. Frank, Frank-Kneeland Machine Co., Pittsburg; vice-chairman, Willis Brown, Walker Foundry Co., Erie, Pa.; Wm. S. Hallowell, Harrison Safety Boiler Works, Philadelphia, Pa.; D. Lewis Bartlett, Bartlett-Hayward & Co., Baltimore, Md.; Jas. Stirling, Harlan & Hollingsworth Co., Wilmington, Del.

Fourth District.—Chairman, Chas. L. Bauer, Warder, Bushnell & Glessner Co., Springfield, O.; vice-chairman, J. H. Webster, Variety Iron Works Co., Cleveland; H. J. Gosiger, Eureka Foundry Co., Cincinnati, O.; Geo. W. Crouse, Aultman, Miller & Co., Akron, O.; H. Stoddard, Stoddard Mfg. Co., Dayton, O.

Fifth District.—Chairman, W. J. Chalmers, Allis-Chalmers Co., Chicago; vice-chairman, Wm. M. Taylor, Chandler & Taylor Co., Indianapolis, Ind.; C. R. Stephens, Moline Plow Co., Moline, Ill.; Lewis Searing, Denver Engineering Works Co., Denver Col.; F. E. Nulsen, Missouri Malleable Iron Co., East St. Louis, Ill.

Sixth District.—Chairman, O. P. Briggs, Twin City Iron Works, Minneapolis, Minn.; vice-chairman, Chas. E. Sammond, Stowell Mfg. & Foundry Co., Milwaukee, Wis.; H. H. Wallis, J. I. Case Plow Co., Racine, Wis.; F. J. Neacy, Filer & Stowell Mfg. Co., Milwaukee, Wis.; Geo. M. Gillette, Minnesota Malleable Iron Co., Minneapolis, Minn.

Seventh District.—Chairman, T. J. Grummond, Montreal Pipe Foundry Co., Montreal, Que.; vice-chairman, John H. Tilden, Curney, Tilden Co., Ltd., Hamilton, Ont.; C. H. Carrier, Carrier, Lane & Co., Levis, Que.; C. H. Waterous, Waterous Engine Works, Ltd., Brantford, Ont.; A. Oakley, Canada Foundry Co., Ltd., Toronto, Ont.

A pleasant development of the meeting was the quiet presentation to Secretary Penton by the Cleveland foundrymen, of a chest of flat silver. Accompanying the gift was a bound volume of letters from the Cleveland firms expressing their appreciation of Mr. Penton's successful efforts in their behalf during the Cleveland strike of 1900-01.

The Howard Axle Works of the Carnegie Steel Co., located at West Homestead, Pa., resumed operations in full this week. The plant has only been running in part during the past month, owing to an accumulation of axles.

PRODIGIOUS STEEL WORKS RECORDS IN OCTOBER.

October from all accounts was a record month so far as the steel production of the country is concerned. All the plants of the Carnegie Steel Co. broke all former records, while the plant of the Bethlehem Steel Co., at South Bethlehem, Pa., made an average increase in steel production of nearly 15 per cent. October was also a banner month for the Ohio plant of the National Steel Co. and from reports received thus far this month, some of the October records will no doubt be broken when this month's figures become known.

During the month the Homestead, Edgar Thomson and Duquesne Steel Works, and the Upper and Lower Union Mills of the Carnegie Steel Co., established new production records, the steel output reaching 343,971 tons of ingots for the month, which is at the rate of 4,127,652 tons of ingots per year. The output of rolled and forged product was 403,061 tons for the month, equal to an annual output of 4,836,732 tons. Compared with the total Bessemer and open-hearth ingot production of the United States for 1900, the October rate of output of the Carnegie works would exceed 40 per cent. It is expected that this enormous make of steel will be continually increased. The new records of the mills, with their best previous records are as follows:

Edgar Thomson Steel Works.

	Old Record.	New Record.	Increase Tons.
Ingots	75,059	82,255	7,196
Rail mills	63,573	67,236	3,663

Duquesne Steel Works.

Bessemer ingots	53,189	55,521	2,332
Open hearth ingots	38,314	40,431	2,117
16" and 11" mills	48,077	51,930	3,853

Homestead Steel Works.

Bessemer ingots	39,600	40 954	1,354
G. H. Ingots, No. 2	39,851	40,613	762
" " No. 3	64,588	65,269	681
38-inch mill	25 947	26 254	217
10-inch mill	2,786	3,138	452
33-inch cogging mill	17,801	18,017	216
33-inch finishing mill	8,299	9,015	716
40-inch mill	17,590	20,045	2,455
35 inch mill	15 610	17 537	1,927
32-inch mill	24,106	25,199	1,094
30-inch slabbing mill	26 696	27,970	1,274
128 inch plate mill	12,626	12,629	3
42-inch Universal mill	8,228	9,161	933

Upper Union Mills.

12-inch mill	2,408	2,864	456
17-inch mill	4,673	4,773	100
20-inch mill	4,462	5,784	1,322
Plate mill, No. 1	5,334	5,966	632
" " No. 2	3,761	3,926	165

Lower Union Mills.

12-inch mill	2,178	2,429	251

The production of rails at the Edgar Thomson plant breaks the record formerly held by the South Chicago Works of the Illinois Steel Co., and it is doubtful if the new record of 67,236 tons will be broken for some time. More phenomenal probably than the output of rails was the output of ingots in the converting department at this plant.

The number of heats made in the month amounted to 5,557. There are four 15-ton converters in the plant, but only three are worked constantly, the fourth always being off for relining and repairs. For the entire month the average output per heat for each converter was nearly 15 tons, showing great evenness in the blowing. The best record was made on Nov. 8, when 238 heats were blown by the three converters. Each converter averaged nearly 80 blows, making the average time per heat 18 minutes. While there have been heats in much less time than this, they have been made for record breaking purposes only. Never before in the history of Bessemer steel making has such work been kept up on three converters for a period of 24 hours. The output for the day amounted to about 3,600 tons. Below we give the number of heats per day blown at this plant for the entire month. The number of heats on Saturdays it will be found is much less than on other days, it will be noticed, as the converting department shut down at 1:30 in the afternoon.

Date.	Blows.	Date.	Blows.
1st.	201	8th.	238
2nd.	210	9th.	221
3rd.	206	10th.	230
4th.	231	11th.	229
5th.	65	12th.	65
6th.	143	13th.	121
7th.	220	14th.	227
15th.	212	24th.	191
16th.	216	25th.	207
17th.	197	26th.	65
18th.	196	27th.	127
19th.	65	28th.	199
20th.	121	29th.	207
21st.	205	30th.	182
22nd.	192	31st.	172
23rd.	196		
		Total for October	5,557

Furnace E of the Edgar Thomson group also made in October a world's record for a 90-foot stack, averaging 555 tons per day, equal to the best performance of any of the big furnaces of the Carrie group which are 105-ft. stacks and are built for an output of 700 tons daily.

October was a banner month for production at the Ohio works of the National Steel Co. at Youngstown, O. Nos. 1 and 2 furnaces made new records and the total output of pig iron in October also established a new record. In the converting mill one turn in 12 hours made 131 heats, while in 24 hours 257 heats were made. In the blooming mill one turn rolled 525 ingots, while for the 24 hours the record was 1,040 ingots. The finished tonnage of billets, sheet and tin bars was the largest in any month in the history of the works.

The plant of the Bethlehem Steel Co., South Bethlehem, Pa., had a greater output last month than at any time in its history. The machine shop and finishing departments increased their outputs fully 20 per cent while the increase in production of iron from the blast furnaces reached 6.1 per cent. The output of the open-hearth department exceeded all previous records by nearly 2 per cent.

During the first week of this month the output of the Shenango Steel plant of the National Steel Co., reached nearly 7,000 tons, while the regular weekly output has heretofore been only 5,000 tons. There are two 8-ton converters.

Financial Importance of the Steel Corporation.

At a banquet of the Bankers' and Bank Clerks' Association at Pittsburg on Monday, Nov. 18, H. P. Bope, first vice-president and general sales manager of the Carnegie Steel Co., in the course of an address on "The Banker and the Business Man," made the following reference to the financial transactions of the United States Steel Corporation:

"You will agree with me, I think, in what has been said, when it is comprehended that the transactions of one single corporation, based upon its recent statement, are greater in value than those of the 14,000 odd banks in the United States and that its earnings will exceed those of the 3,500 National Banks of the country. Consider then, all the various business institutions and corporations of the country, and in this view the banking interests constitute a very small part of the great business community, though it wields a power and an influence vastly disproportionate to its actual transactions. Coming a little nearer home, the total clearings of the Pittsburg banks in 1900 were in round figures, $1,700,000,000. The transactions of the Carnegie Steel Co. during the same period were one-twelfth of the clearings. Our pay roll amounted to $15,000,000, and we disbursed to the railroads for freights another ten millions."

Referring to the clearing house he said:

"When the clearing house system was adopted, the banks made a great step in the direction of consolidated interests. Would not business be better subserved if now a further step should be taken and the so-called 'trust' idea adopted to the extent, at least, of a greater consideration for each other's interests? Let us suppose there has been a period of great prosperity. Loans have been expanded; everything is on a 'boom' basis. A cloud appears in the financial sky and every one rushes for cover. Reserves must be increased at no matter whose expense, and 'may the devil take the hindmost.' I believe the idea has been partly worked out in New York for a sustaining interest in such cases. Probably it is so here. Panics should be—I believe can be—if not entirely prevented on such lines, at least have their severity mitigated."

S. P. Harbison, of the firm of Harbison, Walker & Co., Pittsburg, Pa., manufacturers of fire brick and clay, made a gift of $50,000 to the Western Theological Seminary of Allegheny, Pa., this week.

CINCINNATI MACHINERY MARKET.

CINCINNATI, Nov. 19.—The machine tool trade is in a most satisfactory condition. The only drawback to it is that the concerns are not able to make delivery as readily as they might wish. If any proof were needed that they are having more business than they can well attend to it would be found in the fact that many concerns are still planning new additions and those that have already made or begun additions are working hard to get into them.

It is to the domestic trade that the machine tool men look for their best business now, though the foreign demand is better than it was some months ago and is improving in some sections. There is complaint here and there of the increased cost of the product due to the advance in the price of material and the fact that the amount of work given by the same force varies from time to time.

One of the most important additions to an already large capacity is that for which grading is now being done by the Bullock Electric Mfg. Co. This company has the third largest electrical machinery plant in the country and has just arranged to add another building 250x500 feet at an initial cost of $50,000. This will be constructed with a view to building the largest electrical apparatus used. It will be just adjoining the administration building of the company and be about twice the height of the other buildings. In the new building will be set up a 50-ton traveling crane.

The American Laundry Machinery Co. has made an arrangement with the Barker & Chard Machine Tool Co., by which the latter has turned over its entire plant to the laundry machinery concern, the plan being to go ahead as far as possible with the manufacture of some of the special machinery of the concern that was recently burned out. The American is now looking for a new and permanent location and it is likely that it will be found necessary to build a new plant in the suburbs. The company has made a settlement with the insurance companies on the basis of a total loss, the amount realized being about $75,000.

At the meeting of the Manufacturers' Club last week Murray Shipley, of the Lodge & Shipley Machine Tool Co. read a paper on the question of reciprocity. In this Mr. Shipley pointed out how, in the opinion of the greater number of machine tool manufacturers, reciprocity would be a good thing for the industry. He also supplemented his paper by reading telegrams from the prominent machine tool manufacturers of the country to the number of 25 or 30 and there were but two out of the entire number that expressed any dissent from the opinion that reciprocity would benefit their business. Mr. Shipley is now in Washington attending the reciprocity convention as a delegate from the Manufacturers' Club.

The Bickford Drill & Tool Co. is putting on the market a new style radial drill that embraces a number of new features and that has been quite highly commended by those who have seen it. This concern is running a night force and has just bought a three-story building across from its present location on Front and Pike streets.

The Warner Elevator Mfg. Co. now has plans and will begin the erection of a new wing to the present factory on Spring Grove Ave. The lot recently purchased by the company adjoins the present ell-shaped property on the north. The property already owned has a frontage on Spring Grove Ave. of 115 feet and runs back 490 feet to Valley St. The ell extends south 150 feet to Alfred St., where it has a frontage of 125 feet. The piece recently purchased has a frontage of 56 feet and runs back 490 feet to Valley St.

The Bullock Electric Mfg. Co. has made ready to ship a 1,000-kilowatt three-phase generator to T. Pringle & Sons, of Montreal, for the new generating station that is being erected at Sheiks Island, near Montreal. The machine is capable of developing 1,200-h. p. The Bullock company has also received an order for an 800-kilowatt generator to be delivered to the Union Traction Co. of Philadelphia.

The J. A. Fay & Egan Co. directors met last week and declared the regular quarterly dividend of 1¾ per cent on the preferred stock.

Charters have been recently granted at Harrisburg, Pa., to the following new corporations: Middleton Car Works, Middletown; capital, $100,000. Griffiths Charcoal Iron Mills, Clinton Township, Washington County; capital $200,000. The Alan Wood Iron & Steel Co., Philadelphia; capital, $1,250,000.

CONSOLIDATION OF EASTERN PLATE MILLS.

A transfer of the plants of the Lukens Iron & Steel Co. and Worth Bros., Coatesville, Pa.; Central Iron & Steel Co., Harrisburg, Pa., and the Tidewater Steel Co., of Chester, Pa., was made last week to interests closely affiliated with the United States Steel Corporation. The amount involved is reported to have been nearly $25,000,000. The purchasers have not yet applied for a charter for the four absorbed plants, although it is stated that there is a possibility of one being taken out within the next few weeks and the capitalization will be about $25,000.

We can also state on reliable authority that these plants may at some future date be taken over by one of the large iron and steel interests, but as yet nothing has been done in this direction. For the present the plants will continue to operate as heretofore, under the same managements.

The absorption of these plants will greatly steady the plate market in the East, where these four interests were strong competitors. While a price agreement has existed for some time on plates it is said that a disagreement as to the tonnage to be awarded these plants was a strong factor in bringing about this result. While the terms of the sale have been kept quiet and all arrangements are of a private nature it is reported that the 80,000 shares of the Tidewater Steel Co. were purchased at about $12 per share, $10 par.

With these four interests combined the only other parties to the plate agreement are the United States Steel Corporation, Crucible Steel Co. of America, Jones & Laughlins, Ltd., and the Otis Steel Co., of Cleveland, O. The only outside plate producer is the Carbon Steel Co. of Pittsburg, whose output consists mainly of special acid open-hearth plate. The combined capacity of the four plants purchased amounts to about 300,000 tons of plates per year.

Worth Brothers Co., Coatesville, Pa., operating the Brandywine Rolling Mills, built their plant in 1882. In addition to having three trains of rolls, with an annual capacity of 50,000 tons, they have three 35-ton open-hearth furnaces, two acid and one basic, with an annual output of ingots amounting to 45,000 tons.

The Lukens Iron & Steel Co., Coatesville, Pa., in addition to having three trains of rolls for plates with an annual output of 60,000 tons, have an open-hearth steel plant with an output of 75,000 tons of ingots annually.

The Central Iron & Steel Co., Harrisburg, Pa., was formed by the consolidation on May 1, 1897, of the Central Iron Works, Chesapeake Nail Works and the Paxton Rolling Mills. Annual capacity about 125,000 tons of iron and steel plates.

The plant of the Tidewater Steel Co., Chester, Pa., has an annual capacity of 50,000 tons of plates, skelp and shapes.

The suit against Jones & Laughlins, Ltd., of Pittsburg, Pa., commenced by a property owner for $10,000 damages alleged to have been done by smoke and fumes from the new coke oven plant operated by the company was decided in favor of the company at Pittsburg this week.

The Bessemer Foundry Co., of Grove City, Pa., has been organized for the manufacture of gas engines and castings. Benjamin Spearman, of Sharpsville, Pa., has been elected president; A. Seaton, vice-president; W. H. Christy, secretary; J. M. Albin, treasurer and general manager.

The Brown & Zortman Machinery Co., of Pittsburg, Pa., has increased its capital from $25,000 to $100,000. Owing to the large amount of business in all lines of machinery that this concern is doing the increased capitalization was necessary to conduct the business.

The Keystone Car Wheel Co., of Pittsburg, whose plant is located at West Homestead, Pa., has increased its capital from $100,000 to $400,000. This increased capital was decided upon to provide for the improvements made during the year, increasing the daily output of car wheels from 300 to 550.

In the 24 hours, Nov. 11-12, the tonnage of open-hearth ingots produced at the Sharon, Pa., plant of the National Steel Co., amounted to 665 tons, breaking the best previous record of 602 tons. The plant was originally designed to produce 400 tons per day.

THE CLEVELAND MACHINERY TRADE.

The various shops in and around Cleveland report the continuance of that extremely brisk business activity that has prevailed in the past few months. There is no let-up whatever in the steady influx of orders, and skilled workmen, pattern-makers in particular, are in constant demand. There has been no slackening of the building operations now under way locally, but the indications of a break in the fall weather will interfere somewhat with the placing of new contracts for the erection of factory structures. Rumors are to be heard of new enterprises to be located in Cleveland, and the Everett-Moore syndicate has announced an intention of pushing its interests at Wyckliff, and will invite manufacturers to look into the advantages of sites there.

The Gobeille Pattern Co. say that the locomotive builders are crowded with work and that cars, both of wood and pressed steel construction, are in great demand. The Gobeille company is making more than $1,000 worth of patterns a week for each of these interests—especially duplicating in aluminum and brass, patterns for the malleable and steel parts for freight cars and compound cylinders and component parts for locomotives intended for export shipment. Orders on hand include the names of seven engine builders, the balance of the work being close regulation patterns for electrical apparatus and gas engines for heavy duty purposes.

N. B. Dixon, manufacturer of patterns, combination band and scroll saws, reports a steadily increasing business in wood and metal patterns and letters. The present facilities are becoming inadequate and the shop capacity is to be increased by the addition of more rapid working machines and tools. These changes will necessitate an increase in motive power.

The Cleveland office of Manning, Maxwell & Moore reports that there is a good outlook for business during the winter. The firm has the contract for six electric traveling cranes for the large steel addition now under way at the Interstate Foundry Co.'s plant. These are of the Shaw type.

The Reade Machinery Co., dealer in new and second-hand machinery, is contemplating a further extension of the business, and present plans will probably mature in the spring. The firm finds an extremely active condition of the machinery business, and the demand for both new and second-hand machinery is unusual.

Kaltenbach & Griess, consulting and contracting engineers, have the addition to the Interstate Foundry Co.'s plant well under way. This is to be used for the production of the heaviest class of castings. Kaltenbach & Griess have partly awarded the contracts. The American Bridge Co. will construct the steel foundry building, which will have a main crane runway, 425 feet long and 80 feet span, fitted with two 25-ton traveling cranes. One 40-feet lean-to will be equipped with two 5-ton electric traveling cranes, and a 30-feet lean-to is to be fitted with another pair of 5-ton electric traveling cranes. Kaltenbach & Griess are also consulting engineers for the extensive plant of the Johnston & Jennings Co., now under erection on East Madison avenue. The foundry building will be 250 feet along the center aisle with a 60-ft. span fitted with a 15-ton electric traveling crane. There will be a lean-to on each side 25 feet wide. The charging floor will be 35 x 65 feet. Both of these plants will have notable lighting and ventilation facilities, with all modern conveniences throughout for handling both rough and finished material. Pneumatic appliances will be freely introduced and all machinery will be motor driven and direct connected. There are six other buildings on the property of the Johnston & Jennings Co., consisting of the pattern safe, 30 x 60 feet; the power house, 40 x 85 feet; detinning building, 64 x 160 feet; storage building, 40 x 94 feet; precipitating building, 64 x 144 feet, and an office building, 40 x 40 feet. The contract for the steel foundry building has been awarded to the T. H. Brooks Co. of Cleveland, who will also build the steel trusses and all the steel work for the power house, pattern safe and the other buildings.

The Marshall & Huschart Machinery Co. reports an excellent business in machine tool lines and that the Cleveland district is yielding as nice a run of trade as could be desired. The company handles the local sales for several Cincinnati machine tool builders and some Eastern manufacturers.

J. H. Lyons, formerly a brass goods manufacturer on the Viaduct at Cleveland, has organized a new company at Geneva, O. The enterprise will be incorporated the coming week with a capitalization of $10,000. It is the intention of the promoters to take over the brass department of the Knapp & Pratt Mfg. Co., and greatly increase the present output of the plant.

The Elwell-Parker Electric Co., manufacturer of standard and special electrical machinery and apparatus, reports the following recent contracts: Two 200-k. w. direct connected engine generators for the Brown Hoisting Machine Co.'s new plant in Cleveland; five marine generating sets, a continuation of a previous order of eight compound marine generating sets of 200 lights capacity each, for the American Ship Building Co., Cleveland; one 150-k. w. direct-connected engine generator for the Northern Engineering Co.; a large and elaborate switchboard, also two 75-h. p. and two 50-h. p. hoisting motors for the Brown Hoisting Machine Co.; one 150-k. w. belted generator with a dozen motors of various sizes for the Cleveland Bag Factory, and two special converter charging sets for automobile work to the order of the Baker Motor Vehicle Co., of Cleveland.

The Garry Iron & Steel Co. is exceptionally busy on its new type of pneumatic crane and regular structural business. Among other recent contracts is one for all the structural steel in an immense industrial plant at Pueblo, Col. This will doubtless be the only all steel wagon factory in the country. The enterprise is already incorporated with a capital of $350,000 as the Steel Wheel & Wagon Co. Wm. H. Schofield is president and general manager; George W. Bowen is vice-president; H. T. Wright, treasurer, and S. I. Heyn, secretary. These gentlemen and R. H. Lee, superintendent of the Minnequa plant, are the directors of the company. Every part of the Schofield wagon is made of steel, with the exception of the tongue.

The Balkwill Pattern Works, manufacturers of wood patterns and models, are in their new quarters at 970 Hamilton street, with improved equipment and an increased force of workmen. Increasing business indicates a growing appreciation of the fact that patterns may be manufactured on factory lines and that up to a certain point there is no money in the maintenance of a pattern department in the smaller shops.

The Chisholm & Moore Mfg. Co., manufacturer of pneumatic tools, cranes and malleable iron castings, reports that while it cannot point to any one extraordinary order, yet the business is in a most flourishing condition, and that large orders are being received every day for the full line of its goods.

The Globe Machine & Stamping Co. is about to remove its shops to larger quarters in the new building at Nos. 970 and 972 Hamilton street, where the company will install additional machinery as fast as it can be procured. Their work consists of a general machine shop jobbing business, building special machinery, making special tools, punching and forming dies, sheet metal stamping and manufacturing to order hardware specialties, novelties, and small machinery. The business is under the management of A. F. Schroeder.

The regular meeting of the nut and bolt manufacturers of the country was held in New York this week. There was the usual discussion of prices, but no material change is reported. There have been rumors of a consolidation of the nut and bolt manufacturers, but there seems no more than the usual foundation for these.

At a meeting of the stockholders of the Penn Steel Casting Co., of Chester, Pa., held last week, the following directors were re-elected: M. H. Bickley, F. Baldt J. M. Bernard, G. M. Booth and J. W. Hawley. Mr. Bickley was re-elected president; Fred Baldt, general manager, while G. M. Booth was elected secretary and treasurer.

The foreign shipments of the American Steel & Wire Co., through Eastern ports made during October amounted to 7,500 tons. This is the record monthly shipment for this year and exceeds the shipments made during the month of September by 40 per cent. Australia was the biggest buyer, 2,616 tons of wire products having been sent to this island. The exports to Europe amounted to nearly 1,000 tons. The export shipment of nails amounted to 1,226 tons.

NEW CINCINNATI MILLING MACHINE.

The accompanying illustrations show the latest pattern of milling machine made by the Cincinnati Milling Machine Co., Cincinnati, O., as exhibited at Buffalo. Fig. 1 shows a view of the complete machine. Its chief feature is the positive feed mechanism which is shown in detail in Figs. 2, 3 and 4. The features incorporated in the mechanism are: A positive gear

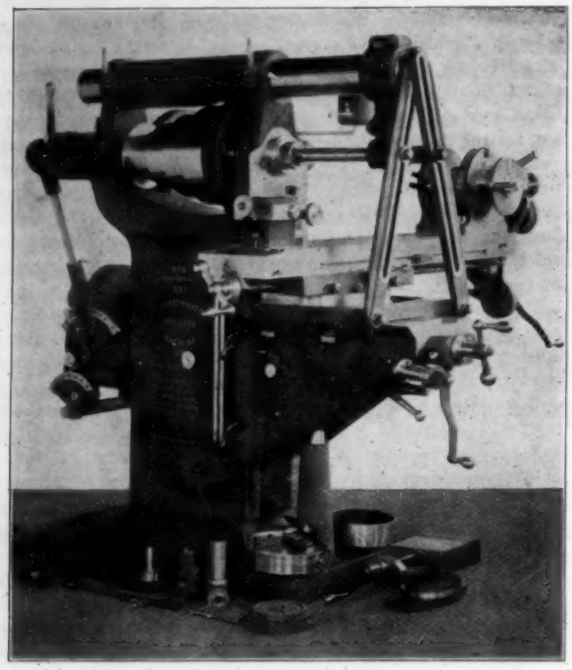


FIG 1.—THE NEW MILLER, BUILT BY THE CINCINNATI MILLING MACHINE CO.

driven feed, a wide range of feed changes, means for changing from any one rate of feed to any other rate of feed conveniently and without stopping the machine.

Part of the mechanism is placed at the rear end of the milling machine spindle, and part is incased in a gear box at the rear of the column. The connection between these two parts of the mechanism is by means of a vertically inclined shaft.

Fig. 2 shows the upper gear box complete on the column of the machine. Fig. 3 shows a rear view of the lower gear box, with covers removed, and Fig. 4 a front view of the same mechanism showing the arrangement of the shifting levers.

Referring to Fig. 2, a double gear, placed on the end of the main spindle meshes, with either one of two gears on a sliding sleeve on a supplementary spindle in the upper gear box. The sleeve may be moved to an intermediate position by the lever, in which case no motion is imparted to the upright feed shaft; or the sleeve may be moved to the right or left, bringing respectively the different gears in mesh for either of the two speed ratios obtainable in this way. The supplementary shaft projects through into the upper gear box and drives the feed shaft M (Fig. 3) by means of bevel gears. The vertically inclined shaft M in turn drives the shaft in the lower gear box upon which are mounted the spur gears R and S, as shown in Fig. 3, through the mitre gears at G, which are of steel, casehardened. All the spur gears of the feed mechanism are of steel. Inside of the lower gear box will be seen two cones of four gears each, running loose on their shaft and driven independently by the gears R and S, the smaller gear R engaging the largest gear on one cone, and the larger gear S engaging the smallest gear on the other cone, thus imparting widely different speeds to the two cones. From these cones motion is transmitted to the various feed screws through an intermediate gear, which is made to slide on its shaft by means of the rack and sector, and placed into correct position for engaging any one of the cone gears, by means of the lever which actuates the sector. This is the lower lever shown in Fig. 4. The position of this lever, at any time, indicates the rate at which the machine is feeding in thousandths of an inch per revolution of spindle, by means of raised figures on the lever quadrant.

The lower lever having been placed into position to obtain the desired rate of feed the intermediate gear is brought into mesh with the proper cone gear by the upper lever in Fig. 4, which moves the entire lower portion of the mechanism. This is accomplished by means of a helical groove in the hub of the lever, which engages a pin in the slide upon which are mounted the lower lever, sector, rack and intermediate gear.

By means of the combination of these two mechanisms sixteen different speeds are imparted to the feed shaft, advancing by even graduations from .006 inch to .300 inch for each turn of the spindle. The lower lever acting as an indicator enables anyone to tell at a glance just how fast the machine is working.

By shifting the levers on the feed mechanism, any one of the sixteen different rates of feed may be obtained, and a change from any one rate of feed to any other may be made without stopping the machine, since there are no change gears to interpose nor belts to shift. Any one of these rates of feed may be used in combination with any of the 16 different spindle speeds, providing in all 256 different combinations. The spindle speeds vary from 9 to 350 turns per minute and have been chosen with a view to secure the proper cutting speed for cutters of standard diameters.

With these advantages the capacity of the machine for removing metal is only limited by the pulling power of the main driving belt. The rate of speed can be changed practically instantaneously. It is positive, at all times, imparting an even motion to the table, thereby avoiding the broken cutters and spoiled work which so often result from a slipping feed belt. In addition to this new feed mechanism, there are other improvements on these machines. A telescopic vertical feed screw which does away with the necessity of cutting a hole through the floor; clamping devices, which enable one to firmly lock the knee to the column or the saddle to the knee when the longitudinal feed alone is being used, thereby wonderfully increasing the rigidity of the machine; sliding covers on the knee, which protect the feed screws

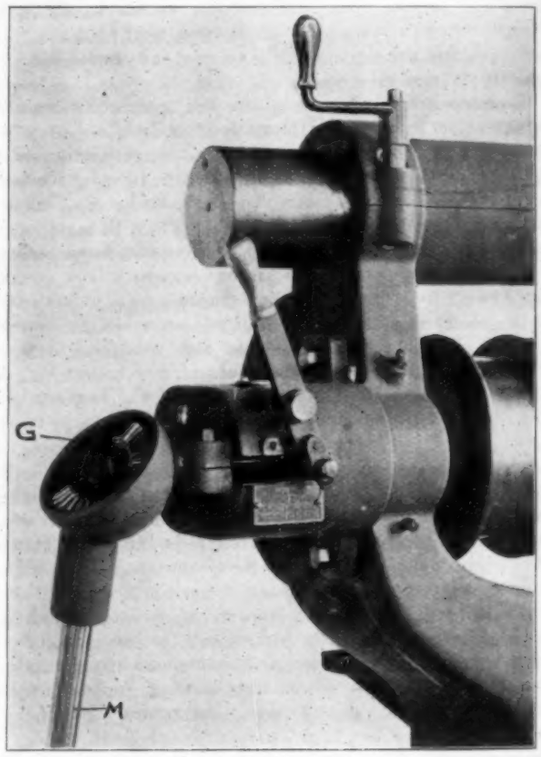


FIG. 2.—UPPER GEAR BOX WITH MITER GEAR COVER REMOVED.

from dirt and cuttings, and a cylindrical overhanging arm, which, in addition to the regular support for the arbor, is also provided with a support which can be adjusted close to the cutter, thus supporting the arbor at any point in its entire length. These features are common to all the back-geared machines made by this company.

OBITUARY.

President John A. Johnson of the Gisholt Machine Co., of Madison, Wis., died Nov. 10 at his residence in that city. He was a native of Gisholt, Norway; was born in 1832, and came to this country when he was 12 years old. From the selling of farm machinery he progressed to the implement

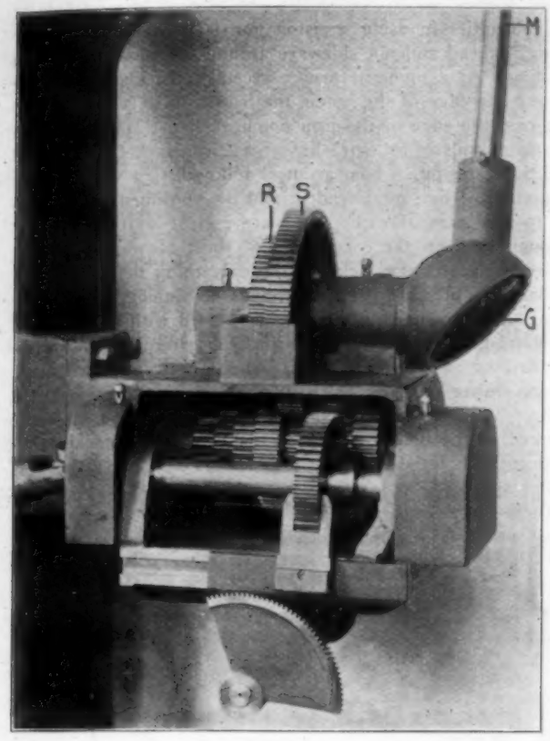


FIG. 3.—LOWER GEAR BOX WITH COVER REMOVED.

business and in company with M. E. Fuller built up one of the largest shops of its kind in the Northwest. A dozen years ago he organized the Gisholt Machine Tool Co., at Madison, with his four sons, and the striking features of this machine and its method of manufacture excited much interest. The business will be continued by the sons, who have practically had control for some time.

William Bowler died in Cleveland, Nov. 15, from pneumonia. He was born in Carlisle, N. Y., in 1822, and became a resident of Cleveland in 1851. He took part in the organization of the firm of Lord, Bowler & Co., manufacturers of machinery, and retained an interest up to two years ago. Mr. Bowler became interested with his brother, N. P. Bowler, in the operation of a foundry in 1863, and the concern was organized as the Bowler Foundry Co., both continuing their connection with the concern. The deceased was an active supporter of Hiram College and many local benevolent institutions.

Henry B. Cobb, president of the Chicago Wire Co., died at his home, Wilmington, Del., on Saturday, Nov. 9, aged 58 years. Mr. Cobb was an inventor of note, many of his patents being in use today.

William McMillan, aged 60, president of the American Car & Foundry Co., died at his home in St. Louis, on Friday, Nov. 15, of pneumonia. Deceased was born in Hamilton, Ont., and was a brother of United States Senator McMillan of Michigan.

Heavy Car Orders.

The Baltimore & Ohio Railroad has decided to place orders for additional motive power and rolling stock for 1902 delivery, the cost of which will closely approximate $7,000,000. The company has already, in addition to this expenditure, placed orders for 55,000 tons of steel rails. The order for motive power and rolling stock includes 50 locomotives, 38 passenger cars and 6,000 freight cars. The rail orders for 1902 follow: Cambria Steel Co., 10,000 tons 85-pound; Maryland Steel Co., 11,000 of 100-pound and 4,000 tons of 85-pound; Carnegie Steel Co., 38,000 tons of 85-pound rails.

The recent Pennsylvania Co. car orders and inquiries amount to 14,000 cars. It is figured that the Pennsylvania and the B. & O. car orders for 1902 will amount together to 25,000, an unprecedented volume.

Domestic Effect of British and German Iron Prices.

Archer Brown, of New York, in commenting on the condition of the English and German iron markets and their relation to the domestic market says in the current review of Rogers, Brown & Co.:

"Strangely enough, the markets in England and Germany continue to fall off. Middlesboro No. 3 is quoted at 43-9, or about $10.50 per ton at furnace. This would admit of shipments to the United States if our domestic prices should further advance $1 or $2 per ton. Germany is already shipping several full cargoes of ferro-silicon to Philadelphia and Baltimore, and there is a report that one cargo of Bessemer pig has been contracted. It is explained that these transactions are abnormal and grow out of the necessity of German works to turn materials into money to meet obligations. A leading Glasgow iron dealer, just arrived, states that the cause of the recent slump in England is the pressure of this kind of business from Germany. English trade itself is described as good. Russia is in almost as bad a fix industrially as Germany. Little improvement in Great Britain or on the continent is looked for until Germany has re-adjusted to a lower level of prices and smaller production. It is worthy of note that the United States is now producing quite 2,000,000 tons more than Germany and Great Britain combined."

At a meeting of the Star and Alcon lodges of the Amalgamated Association held last week, the men formerly employed in the Star and Monongahela tin plate plants of the

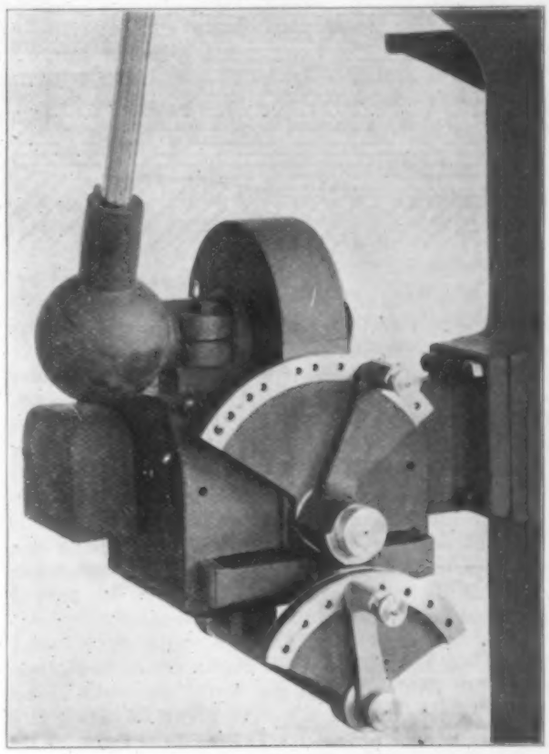


FIG. 4.—FRONT VIEW OF THE LOWER GEAR BOX SHOWING THE SHIFTING LEVERS.

American Tin Plate Co. decided that they would not apply for their former positions in these plants as long as the Monessen system is in vogue. The two plants are operating in full, however, and the company has no trouble in securing competent men. Had the men decided to return in a body it is doubtful if many would have been given employment.

PLUMBAGO IRON NOTCH FOR BLAST FURNACES.

BY JOHN M. HARTMAN.

In the olden time when cinder ran from the furnace through the clay packing, under the tymp, then over the dam and down the fall, the blast pressure was from three to five pounds. As more blast was used the pressure became higher, and to prevent this higher pressure from tearing out the clay packing, blast had to be slacked, even at the risk of cinder running back in the belly pipe. As time is iron with the blast furnace, during the time that blast was slacked less iron was produced. Even with the precaution of slacking blast the clay would be torn away, requiring from two to five minutes to clay up the cinder hole; during this time the blast was all thrown off.

In 1868 Lurrman introduced his cinder notch, but did not make it a success. In this invention the cinder was drawn through a ¾-inch coil of pipe with iron cast around and inside of it, leaving a 1½-inch hole. The cast iron was soon burned out of the hole, enlarging it too much, so that the blast had to be slacked. When the iron was burned out of the hole the cinder would melt through between the coil and start a cinder leak outside of the notch. This led to the use of bronze notches with a continuous water surface, which did well, but in the faster driving of the furnace the walls around the notch melted away. Coil breasts were then used, but the cast iron melted off the coil and let the cinder leak through between the coil. In 1876 at the Durham furnace a large closely-wound coil breast was built in the outer wall. A second breast of bronze was placed inside the coil breast and in it was placed the cinder notch. This gave a more powerful water cooling and held the walls. It is in use to this day at all furnaces producing pig iron.

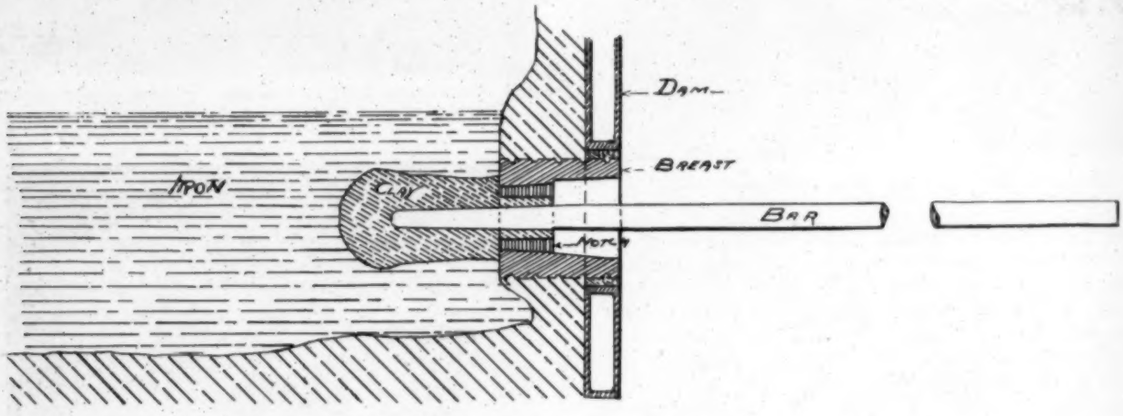
To get the current of cinder to flow slowly and steadily from the furnace is the proper way to run the cinder notch. At Durham casting every eight hours the cinder flowed seven hours steadily. It is much easier on the notch to have cinder flow steadily from a small notch instead of tapping at intervals through a large notch and have a great rush of cinder, provided the furnace produces cinder fast enough. The success of the notch is due to holding the hole to a definite size, which prevents rushes of cinder. In the rush of cinder with a large notch the falling molten iron is carried out, burning the notch and causing loss of time and renewals.

At times the crucible builds up under the notch, which catches the iron and holds it in front of the notch. If this iron is drawn off slowly through the notch, the notch is not burned. Five tons of iron have been drawn off slowly at a time without burning the notch. The rapid circulation of the water in the notch chills the iron in it for an eighth of an inch, forming a bushing in the notch to protect it.

If cinder can be handled with a small notch and slow current, why cannot iron be treated the same way? The cinder causes no explosion if water mixes with it, but iron does. In the early stages of Bessemer steel-making trials were made of different material for pouring or running the steel through from the ladles into the ingot molds. It was finally found that black lead or plumbago with a bond of the best fire clay to hold it together was the best material. This has continued in use until today. If we take a cylinder of this material with a 2½-inch hole and insert it in the iron notch the iron can be run through it with a steady even flow and no rushing. This will last until the clay packing around the notch melts away when the opening outside of the notch must be claved up again. This melting of the clay around the hole in the dam is serious at all times and more so as the blast pressure becomes higher, which both melts and tears it larger. One of the difficulties in using a piston gun is that it fills the hole straight ahead and not sideways around the edge of the dam opening. At a modern furnace recently, the clay not filling around the edge of the notch, the iron worked along about 2 feet past the edge of the iron notch, melted through between the water coils of an extra heavy cast iron jacket, and flowed into the water pit. A bombardment followed that will never be forgotten by the superintendent and the workmen. Coil jackets to take care of molten iron are useless, as the iron cuts through between the coil. A solid sheet of water over the entire surface of the jacket is the only thing that is reliable.

Placing a plumbago breast around the plumbago notch, the clay packing around the notch is dispensed with and the wall is retained. By this means the iron is drawn off steadily without rushing and the walls around the opening are not melted. The slower steady stream of the iron does not melt the walls. To stop the iron at any time a steam gun is used, adapted to the notch, which is quickly applied and shot off, closing the hole effectually. This should be done as soon as cinder appears when casting.

These notches are renewable while blast is on the furnaces. They cost 25 cents apiece, and will run 700 tons of iron on an average. When they burn out too large they are renewed by taking out the bushing and carefully digging out the clay forced in the notch by the gun, and inserting the notch. This is done with blast on and no danger has so far resulted from it; and none can, as the clay forms a bridge over the opening of the breast and is supported by the end of the breast. The smallness of the opening in the breast must not be lost sight of for holding the clay. When the notch is shot or filled with clay a taper bar is pushed well into the clay and allowed to remain until the clay is hardened, when it can be removed. Should there be any tendency to work hot on the iron notch a jet of cold air blown in the hole after the bar is removed will chill the iron around the hole.



ARRANGEMENT OF PLUMBAGO IRON NOTCH.

The bar inserted in the clay stopping should be greased with any cheap grease to prevent its sticking to the clay. The farther in this bar is pushed the less drilling will be required to reach the iron. The clay should be drilled through to the iron with a star drill and a light sledge until it is tender; then knock the bar through quickly.

Two objections will be brought to this arrangement by practical furnacemen: First, pieces of coke will get in the notch and stop the flow of iron. In the trials made, extending over three weeks, this did not occur. Second, the iron will freeze in the opening and compel you to destroy the notch to get at the iron. This did not occur, as the notch is in so near the iron the latter has no chance to freeze before getting out of the hole. With the old style clay hole you have a

long distance to drill in to get at the iron and this long time of drilling gets the hole cold, causing the iron to chill in it. Admitting it does chill, you can quickly apply one of Grammer's electric burners and burn out the hole in a short time.

The plumbago notch being an excellent non-conductor, the Grammer burner will make more rapid progress than on clay packing. As the notch holds the flowing iron to a definite level there is no burning or melting down of the iron notch to a lower level.

This iron notch will be found a cheap, simple arrangement if it is properly cared for, but it will have to go through the toils before it is generally used, as the cinder notch did before it. To compare this with the ordinary clay notch, the following must be taken into consideration: The small amount of clay used, only 2 shovelfuls. The certainty of closing the hole. The quickness of doing it. The short time to drill to get at the iron, owing to the notch being closer to the iron. The absence of cinder at casting. The absence of iron breaking out about the iron notch.

The notch requires care and attention, but will amply repay any one using it right.

OUTPUT OF BLAST FURNACES OF UNITED STATES.*

November 1, 1901.

Location of Furnaces.	Coke and Anthracite.					Charcoal.				
		In Blast.		Out of Blast.			In Blast.		Out of Blast.	
	Total No. of Stacks.	Number.	Weekly capacity.	Number.	Weekly capacity.	Total No. of Stacks.	Number.	Weekly capacity.	Number.	Weekly capacity.
New York	14	5	6752	9	2857	3	1	760	2	250
New Jersey	7	4	3300	3	1350	.....	.....	.....	.....	.....
Spiegel	3	3	511	0	0	.....	.....	.....	.....	.....
Pennsylvania:						13	2	76	11	470
Lehigh Valley	26	16	8855	10	4778	.....	.....	.....	.....	.....
Spiegel	1	1	139	0	0	.....	.....	.....	.....	.....
Schuylkill Val.	14	11	8626	3	1275	.....	.....	.....	.....	.....
Upper Susqu. Val.	2	1	1008	1	336	.....	.....	.....	.....	.....
Lower Susqu. Val.	8	5	5271	3	1431	.....	.....	.....	.....	.....
Spiegel	1	1	504	0	0	.....	.....	.....	.....	.....
Lebanon Valley	12	11	8688	1	518	.....	.....	.....	.....	.....
Pittsburgh Dist.	33	28	74864	5	12130	.....	.....	.....	.....	.....
Spiegel	1	1	2520	0	0	.....	.....	.....	.....	.....
Shenango Valley	16	13	16623	3	2794	.....	.....	.....	.....	.....
West'n Pennsylvania	21	14	19391	7	3938	.....	.....	.....	.....	.....
Spiegel	1	1	581	0	0	.....	.....	.....	.....	.....
Maryland	5	4	6008	1	1200	4	0	0	4	443
Wheeling District	9	9	10353	0	0	.....	.....	.....	.....	.....
Ohio:						8	1	54	7	489
Mahoning Valley	15	14	28599	1	1867	.....	.....	.....	.....	.....
Central & Northern	14	14	24120	0	0	.....	.....	.....	.....	.....
Hocking Valley	2	1	450	1	400	.....	.....	.....	.....	.....
Hanging Rock	12	9	6494	3	730	.....	.....	.....	.....	.....
Illinois	15	15	33019	0	0	.....	.....	.....	.....	.....
Spiegel	2	2	1673	0	0	.....	.....	.....	.....	.....
Minnesota	1	0	0	1	763	.....	.....	.....	.....	.....
Wisconsin	4	2	2668	2	1474	.....	.....	.....	.....	.....
Missouri	1	0	0	1	570	.....	.....	.....	.....	.....
Colorado	2	2	5200	0	0	.....	.....	.....	.....	.....
Spiegel	1	1	400	0	0	.....	.....	.....	.....	.....
Virginia	21	15	9307	6	3010	3	2	74	1	61
Kentucky	5	4	1813	1	685	3	0	0	3	200
Alabama	36	21	19701	15	11012	4	3	1083	1	329
Mich., Mo. and Wis.	.....	.....	.....	.....	.....	10	7	4039	3	785
Tennessee	16	8	6000	8	3962	4	2	375	2	280
Georgia	1	0	0	1	450	4	1	480	3	570
North Carolina	1	1	437	0	0	.....	.....	.....	.....	.....
New England	.....	.....	.....	.....	.....	7	3	258	4	217
Texas	.....	.....	.....	.....	.....	4	0	0	4	871
Utah	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oregon	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Totals	323	237	313775	86	57550	67	22	7049	45	4970

SUMMARY.

Fuel.	In Blast.						Out of Blast.			
	Number.			Weekly Capacity.			Number.		Weekly Capacity.	
		Month Previous.	Year Previous.		Month Previous.	Year Previous.		Month Previous.		Month Previous.
Charcoal	22	25	30	7,049	7,444	7,923	45	45	4,970	4,801
Coke and Anthracite	237	221	171	313,775	300,538	207,381	86	87	57,550	54,823
Total	259	246	201	320,824	307,982	215,304	131	132	62,520	59,624

*Condensed from the *Iron Age*. The decrease of unsold stocks, so far as these are reported (none of the stocks of the steel companies being included), was from 361,593 tons Oct. 1, to 273,251 tons Nov. 1, or about 88,000 tons.

A lodge of the Amalgamated Association has been organized among the employes of the sheet plant of the Youngstown Iron & Steel Roofing Co., Youngstown, O.

PERSONAL.

J. W. Britton, for many years a prominent iron manufacturer of Cleveland, formerly president of the Britton Rolling Mill Co., is critically ill.

Nathaniel Baxter, Jr., has resigned as president of the Tennessee Coal, Iron & Railroad Co. On Dec. 1 it is reported Mr. Baxter will become president of the Cumberland Coal & Coke Co.

President Schwab, of the United States Steel Corporation, expects to sail for Europe early in January, to be absent several weeks.

William E. Manning, who retired as chief of the order department of the Republic Iron & Steel Co., last week, was presented with a diamond ring by the employes of this department at Youngstown, O.

At the annual meeting of the stockholders of the Oriskany Malleable Iron Co., held at Utica, N. Y., last week, directors were elected as follows: G. H. Graham, W. W. Sink, E. G. Locke, Samuel Nelson and J. B. Whitten. The last named was elected president, Samuel Nelson vice-president, and George H. Graham, secretary-treasurer and superintendent.

Major Hickman Morgan, a Scotch iron master, spent several days in Pittsburg last week inspecting the iron plants of the district. After leaving Pittsburg he went to Birmingham, Ala.

W. C. Davis, vice-president of the Chicago district of the Amalgamated Association of Iron, Steel and Tin Workers, has resigned to become superintendent of a coal plant at Weir City, Kan.

Capt. L. T. Brown, superintendent of the upper and lower Union mills of the Carnegie Steel Co., at Pittsburg, was presented with a gold watch by H. C. Frick last week. The gift is a token of appreciation of the speed and promptness with which the structural steel for the Frick building was supplied.

John G. A. Leishman, United States minister to Turkey, and Henry Phipps, of Pittsburg, returned from Southampton last week, arriving at New York on the St. Paul.

N. Tamamoto, chief engineer of the Japanese Imperial Government, in charge of the palace which is being erected for the Japanese emperor, was in Pittsburg last week for the first time, and was much impressed with the great iron and steel plants of the district. The structural steel for this palace is being furnished by the Carnegie Steel Co. It amounts to 4,000 tons.

John H. Morgan, one of the trustees of the Amalgamated Association of Iron, Steel and Tin Workers, has been appointed state inspector of workshops and factories of the State of Ohio by Governor G. K. Nash.

Kirt C. Gardner, formerly connected with the Lloyd Booth Co. plant of the United Engineering & Foundry Co., at Youngstown, O., has been appointed contracting engineer for the consolidation, with offices in Pittsburg.

B. R. Cummings, of the Ironton Iron Co., of Ironton, O., established plant at Fort Townsend, and there is a probabilities of Washington. Mr. Cummings will visit the newly has been in Seattle, Wash., the past week, examining the possibility that his firm will locate in that section.

Directors of the Pennsylvania Steel Co. inspected the plant of the Maryland Steel Co., at Sparrow's Point, Md., last week. The party consisted of the following: George F. Baer, George Wood, William D. Winsor, Arthur Brock, Theodore N. Ely, F. C. Smink, F. J. Firth, E. B. Morris, Col. John Cassels and B. F. Coleman, Major L. S. Bent, chairman of the executive committee of the Pennsylvania Steel Co.; E. C. Felton, president, and J. F. Sheehan, freight agent, accompanied the directors.

The newly organized Federated Metal Trades will hold its annual convention at Scranton, Pa., on Dec. 4. The same week the annual convention of the American Federation of Labor will be held at Scranton.

J. K. Dimmick & Co., 1051-3 Drexel Bldg., Philadelphia, have opened a Pittsburg office at Room 513 Fitzsimmons Bldg., in charge of George S. Griscom Jr., who is well known to the iron trade of the Central West.

MANAGEMENT OF THE FOUNDRY CUPOLA.

A paper read by Robert Buchanan before the Staffordshire Iron and Steel Institute at Dudley, Eng., on Nov. 2 deals with practical questions relating to the handling of the cupola. We make a synopsis of the address below:

For cupolas measuring less than 8 feet or 10 feet between the hearth and the charging door no advantage arises from a double row of tuyeres. The area of the cupola in the region of the tuyere should be contracted, not, as is often stated, to reduce the coke bed, but because it ensures a blast right to the center of the cupola, and gives intense and rapid combustion over the whole area of the circle. Above this zone the lining may be enlarged and then run straight, or preferably tapered, up to the charging-door. Practically the contraction of the lining at the tuyeres is equivalent to lengthening the tuyeres towards the center. A double row of tuyeres will act more quickly than a single set of equal area at one level. One row will melt hot iron, two rows will deliver the metal fast and hot, while three rows, although giving hot iron quickly, are apt to cut up the linings and need a deep coke bed, and ordinarily the third row is of doubtful value.

During melting the flame at the charging-door shows what is taking place. There should not be a continuous flame through the last charge, such flaming being merely the dissipation of heat which should be absorbed by the upper layers of coke. Coke at that level should only be warmed, so that when it descends to within 2 feet of the melting-zone it only requires a little additional time to redden it and fit it for the actual work of melting. A bluish-pink flame, which clings to the projections and rough ledges in the chimney, and fires back in ragged streaks into the top of the charge, indicates good work below. A whitish-yellow flame, coming through the charge up into the chimney, and often out through the top, indicates too little air. When this occurs, and when with its appearance the blast-gauge rises, there is probably scaffolding or lodging of the charge taking place. These remarks are based on observations made with a cupola about 15 feet from tuyeres to charging-door.

It is commonly held that the tuyere area should be one-ninth the cupola area, but a good plan is to have the holes in the shell in excess of this proportion, and then reduce by lining until a suitable size is arrived at. The height of the holes from the hearth must depend upon the work and whether a receiver is used. With the latter the lower tuyere may be as low as 4 inches above the hearth. For a 24-inch diameter shell of the ordinary type the author had found a 2-foot depth suitable for some work. A slag-hole is too seldom seen on a cupola, recourse being usually had to the tapping-hole. For all hand-ladle work a bottom 12 inches deep will suffice with a careful and intelligent cupola man. Blast-pressure gauges ought to be the rule.

They indicate what is going on, and show at once when scaffolding occurred. About 12 oz. pressure for speed and economy is desirable; less pressure may give hot iron, but it is wasteful of time and fuel. To prevent scaffolding care must be exercised in lining the cupola to avoid projections and hollows, tapers must be gradual, the coke must not be low in carbon or density or high in ash, and enough limestone or fluor-spar must be used for fluxing. Mixed irons require 56 lbs. of fluxing per ton, while 40 lbs. suffices for all pig iron. Coke should have not less than 90 per cent of carbon. Experience shows that 26 cwt. of 90-per cent carbon coke, would under suitable conditions, do as much work in a given time, and do it better, than 27 cwt., having only 87 per cent. A bit of pig or scrap jammed in front of a tuyere often sets up scaffolding. To remedy this, poker back the obstacle, fill the front end of the hole with pieces of coal and put the blast on again. The difficulty literally melts away. As regards the respective advantages of solid and of drop bottoms, the author votes for the latter, and emphasizes the advantage of this form in fettling the lining.

Wherever possible, chemical analysis should go hand in hand with cupola practice. The fracture of pig iron is an insufficient guide to its quality, though roughly helpful to an experienced person. Chemistry, if applied to pig iron, coke, and the flux, give the foundry master something definite to work upon in mixing his brands. Such analysis must be made with every purchase of material, as brands of pigs and qualities of coke differ largely from time to time. In charging a cupola it should be remembered that the region of the highest temperature is at the top of the melting-zone, and that this is shown by the wear in the lining. No metal is actually melted until this level is reached, no matter how much coke is charged above that level. The bed should be charged to the tuyeres, but no higher, before putting on the first iron, using a thin layer of scrap below the first pig. After this more scrap with coke and limestone following should be added. "Warming the charge" is a fallacious procedure; with a bed up to the tuyeres, blowing may begin at once. The successive charges of coke need only be of sufficient depth to maintain the bed at the level of the top of the melting-zone. The charges of coke ought to be very carefully weighed, and if the metal comes down hot but slowly, it is because the coke charges are too large. In such a case the charge should be reduced by a definite weight, say 28 lbs., and the result watched for a day or two, continuing the process until the limit is found, which will be indicated by the metal getting dull at the end of one charge, and hot as the next comes down. When this point is found the results of the previous experiment should be reverted to and made the standard. For the last two charges of iron in each cast reduce the blast to half pressure. The wastage of linings under full press during the last 15 minutes is more than occurs for hours in a fully-charged cupola.

Experiments extending over a month with a 30-inch cupola, contracted to 19 inches at bottom, and 15 feet from hearth to charging-door, showed an expenditure of coke averaging 1 in. of coke per 7.87 lbs. of iron melted for light work, and 1 lb. per 10 lbs. iron used for heavy castings. The presence of sulphur is detrimental to the finished product. The presence of 0.14 per cent gives hard castings, while, with an additional 0.1 per cent, machine-shop difficulties become serious. Coke yields its sulphur to the iron, and a low percentage in the fuel is essential to good work. Dull iron absorbs sulphur more readily than hot metal, and a pasty and viscous slag will not take up its proportion of deleterious material. The quantity of iron left in the slag varied in samples which the author had analyzed from 1.90 to 10.10 per cent. An average of nine analyses gave: Iron, 4.960; sulphur, 0.270; and phosphorus, 0.049 per cent, the silica averaging 58 per cent. Slag which is allowed to cool in contact with iron gives up a part of its sulphur to the metal. Hot melting appears to give the least iron percentage in slag, but there is scope for investigation under this head.

Additional rewards for faithful service, in the form of stocks and bonds, were given to employes of the Duquesne and Edgar Thomson plants of the Carnegie Steel Co. last week. Those who were rewarded are as follows: Roger D. Bowman, superintendent of the shipping department; George L. House of Braddock, superintendent of the bricklaying and masonry departments; John R. Davies, superintendent of the rolling mill; Edward J. Hamilton, assistant general manager; Frank E. Parks, superintendent of the open hearth mill; J. M. Camp, chief chemist; George J. Brayen, master mechanic; Charles F. McDonald, superintendent of the Bessemer steel mill, and William Ahland, chief draughtsman.

Another test of an armor plate made by the Cosgrove process was made at the Indian Head proving grounds last week. The test was most satisfactory both to the government and to the inventor. The test was witnessed by S. A. Cosgrove, the inventor; John M. Patterson, P. N. French and William D. Corcoran, all of Pittsburg.

As a result of the bi-monthly examinations of the bar iron, sheet and tin plate sales sheets of the Republic Iron & Steel Co., American Sheet Steel Co., and the American Tin Plate Co., no advances in wages were granted the members of the Amalgamated Association.

The following Pennsylvania corporations have increased their capital stock: The Sharon Coke Co., from $10,000 to $2,500,000; the Philadelphia Foundry & Machine Co., from $1,000 to $75,000.

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

New Buyers in the Market and Some of their Wants:—

A. F. Baumgarten & Bro., Park Building, Pittsburg, are in the market for a 10-foot squaring shear, 72-inch 20-foot tubular boiler and a 75 to 100- kilowatt dynamo.

The Winnipeg Machinery & Supply Co., Winnipeg, Man., has established a machinery warehouse at the above place and will carry a large line of all kinds of machine tools, planers, etc. Mr. J. C. Gibson is manager of the company.

The Susquehanna Iron & Steel Co. is considering the erection of a pipe mill in connection with its skelp manufacturing plant at York, Pa. The plant is to have a capacity of 24,000 tons annually. If the plant is not erected by the Susquehanna company, the project will probably be taken up by a private corporation, the skelp, however, to be furnished by the Susquehanna plant.

The National Brass Manufacturing Co. of St. Louis, Mo., has been incorporated with $60,000 capital. W. F. Prier A. P. Prier and H. G. Cummins are the incorporators.

The Griffiths Charcoal Iron Mills were granted a charter last week with a capital of $200,000. The plant will be located at Washington, Pa. William H. Griffiths, N. R. Baker, and W. S. Parker are the incorporators.

The plant of the American Turret Lathe Co., of Wilmington, Del., will be removed to Warren, Pa. Stock to the value of $25,000 has been subscribed for by the Warren citizens, and a site valued at $5,000 has been given the company.

The Abbott Electrical Novelty Co., of Warren, O., will reorganize with a capital of $40,000.

A Pennsylvania charter has been granted the New Castle Forge & Bolt Co., of New Castle, Pa. The capital is $75,000. The board of directors is composed as follows: T. F. Morehead, C. J. Kirk, J. N. Martin, W. H. Cox, J. C. Roberts, A. B. Wheildon and Frank Ryman. The plant will be built at New Castle.

The Sterling Iron & Mining Co., of Antwerp, N. Y., has been incorporated with $400,000 capital. H. H. Adams, J. F. Moore, C. E. Eldridge, W. J. Jamison and D. B. Clark are the incorporators.

The Taft-Pierce Manufacturing Co., of New York, has been incorporated with $300,000 capital. The company will manufacture machinery. G. J. Pierce, H. B. Thayer, A. L. Sult, S. G. Metcalf, D. A. Carpenter, H. C. Jordan and W. W. Shaw are the incorporators.

The Berkeley Springs Shovel, Stamping & Tool Co., of Berkeley Springs, W. Va., has been incorporated with $25,000 capital. G. W. Biser and others are the incorporators.

The Wheeling Board of Trade of Wheeling, W. Va., is negotiating with parties for the location of a sheet mill in their city.

The Chandler Wire Fence Co., of Baltimore, Md., has been incorporated with $300,000 capital. J. R. Kelso, C. T. Crane, S. J. Owens, Joseph Bartlett and A. N. Barker are the incorporators. The company will manufacture wire fences.

New Construction:—

The Henry Pratt Boiler & Machine Co., Chicago, Ill., has purchased from Otto Gresham his manufacturing plant and real estate on Halsted street for $49,400.

The Wichita Stove & Iron Works, Wichita, Kansas, is planning extensive improvements to its plant. Both the stove and architectural foundries are to be considerably enlarged.

Ground has been broken for the new plant of the Holthoff Manufacturing Co., at Cudahy, near Milwaukee, Wis. The boiler shop will be 250 x 100 feet; machine shop, 250 x 110 feet; power house, 60 x 60 feet; pattern shop, 40 x 120 feet, and a two-story office building, 40 x 120 feet.

The engine room at the Cambria blast furnaces, Johnstown, Pa., will be considerably extended to make room for two low pressure engines, which will shortly be installed.

The Warren Foundry & Machine Co., Easton, Pa., will erect a new machine shop 260 x 75 feet. The pattern shop will be 120 x 50 feet.

The Brooks plant of the American Locomotive Co., at Dunkirk, N. Y., will erect a cylinder shop near the foundry, 100 x 300 feet. A large amount of new machinery will be purchased for this department.

E. Cochran and R. G. Crawford will erect a foundry 50 x 75 feet at Sterling, Ill.

Ground was broken last week at Pueblo, Col., by the Colorado Fuel & Iron Co., for the new tin plate mill which the company will erect at that place. The building will be 1,060 x 422 feet.

The Standard Steel Co., Lewiston, Pa., has let contracts for a new open-hearth department, which will be an extension to the axle plant. A new locomotive tire plant will also be built.

The Bessemer Gas Engine Co., at Grove City, Pa., has commenced the erection of a brass foundry.

The Scully Steel & Iron Co., Chicago, Ill., will erect a brick and steel warehouse, 60 x 170 feet.

Fires and Accidents:—

An explosion at one of the central furnaces of the American Steel & Wire Co. Cleveland, on Nov. 18, caused the death of one man, the serious burning of another, and heavy damage to the stack. The explosion was due to a break out.

The plant of the Beckwith Iron Co., Paterson, N. J., was destroyed by fire last week; loss, $50,000.

The plant of the Tyler Foundry & Machine Co., at Tyler, Tex., was destroyed by fire on Nov. 6, with a loss of $15,000.

The boiler plant of William Campbell & Co., Boston, Mass., was damaged to the extent of $12,000 by fire last week.

One man was burned to death and two probably fatally burned by molten slag at the Homestead plant of the Carnegie Steel Co., Homestead, Pa., this week.

The Pittsburg District:—

The S. Obermayer Co., of Cincinnati and Chicago, dealer in foundry facings, supplies and equipments, has opened a Pittsburg office and warehouse at 35th and Charlotte streets. A full line of all kinds of foundry supplies will be constantly carried in stock.

Plans are being prepared by engineers of the Carnegie Steel Co. for the erection of a new angle mill that will roll angles from 3 x 3 inches to 8 x 8 inches. The capacity of the plant will be about 12,000 tons per month. The new mill will be built near the Howard Axle Works. The building will be about 1,000 feet long. Billets from the Homestead steel plant will be rolled and the mill will be of the continuous type.

The American Bridge Co. has been awarded the contract for the erection of the steel work for the new building of the Dollar Savings & Trust Co., at Youngstown, O.

Hubbard & Co., of Pittsburg, manufacturers of shovels, railroad and mining tools, are erecting a two-mill sheet plant adjoining their present works. The sheet bars will be purchased in the open market and they may erect a sheet bar mill later.

John Eichleay Jr. has removed his office from 1,000 Brownsville avenue, Pittsburg to 22nd and Wharton streets, South Side, where he will carry in stock beams, channels, angles and all kinds of structural material for prompt delivery, cut to any length.

The Carnegie Steel Co., has awarded the contract for the erection of the additions to its armor plate plant to the American Bridge Co. The new buildings will adjoin the present armor plate plant and will be located close to the Monongahela river.

The McClintic-Marshall Construction Co., of Pittsburg, has completed plans for the enlargement of its plant located at Rankin, Pa. An extension 100 x 200 feet will be built to the main building.

A bill in equity was filed in the common pleas court at Pittsburg last week against Jones & Laughlins, Ltd., to compel the firm to abate a nuisance to East End property alleged to result from smoke and fumes from the Second Avenue plant of the company. Ore and flue dust from the Eliza furnaces, according to the plaintiffs, penetrate the homes in this section of the city causing great damage to property. This suit will be watched with much interest, inasmuch as it is hardly probable that the court will decide in favor of abolishing the furnace plant, which cost millions to erect and establish.

The Hitchman Coal Co., of Benwood, W. Va., placed con-

tracts last week for all the necessary machinery for the development of coal property along the Ohio river near Benwood, W. Va. The contract for two coaling stations was awarded to the Van Dorn Iron Works, of Cleveland, O., while the Wagner-Palmos Co., of Fairmount, W. Va., was awarded the contract for the coaling apparatus. The Monongahela Manufacturing Co., of Monongahela City, Pa., was awarded the contract for the hoisting machinery and the Jeffries Manufacturing Co., of Columbus, O., will install the electric mining machinery.

A. F. Baumgarten of Pittsburg is organizing the Maryland Sheet Steel Co. for the purpose of operating the sheet plant of the Cumberland, Md., plant of the Crucible Steel Co. of America. The plant contains four sheet mills and a sheet bar mill. The company will be capitalized at $100,000 under the laws of the state of New Jersey. Interested with Mr. Baumgarten are H. E. Weber, H. E. Henderson, H. H. Dickey and Nathan A. Taylor, the latter of Philadelphia.

The McKenna Power Building, which is being erected by the McKenna Bros.' Brass Co., at the corner of First avenue and Ross street, Pittsburg, is fast nearing completion. The company will move from its present quarters on Third avenue to the new building about Dec. 1. The building is 100x84 feet and six stories high.

The capital stock of the Carnegie Tube Co. has been increased from $150,000 to $300,000. The plant is under erection at Carnegie, Pa.

The capital stock of the National Cable & Wire Co., of Pittsburg, has been increased from $11,000 to $500,000.

The West and Northwest:—

The Modern Steel Structural Co., Waukesha, Wis., has contracts for the erection of buildings for the following concerns: Sanitary Enameling Co., Milwaukee, Wis., steel frame for foundry; C., M. & St. P. Ry. Co., La Crosse, Wis., umbrella sheds; Filer & Stowell, Milwaukee, Wis., steel frame for machine shop; Charles Muncwitz, Milwaukee, Wis., steel frame for store building; Northern Electrical Mfg. Co., Madison, Wis., steel frame for machine shop; Muskegon Light & Traction Co., Muskegon, Mich., power house; Brown Corliss Engine Co., Corliss, Wis., steel structure for tank; Allis-Chalmers Co., Milwaukee, Wis., iron work for two furnaces.

The Grand Crossing Tack Co., Grand Crossing, Ill., is completing a three-story addition to its plant, providing about 30,000 square feet of new floor space.

The Scully Steel & Iron Co., Chicago, is building a warehouse, two stories high, 60 x 170 feet.

The Templeton-Kenly Co., Ltd., Chicago, has been incorporated with a capital of $20,000, and will deal in relaying rails, scrap iron, and manufacture the Simplex car jack. The officers of the company are Walter B. Templeton, president, and W. K. Kenly, secretary and treasurer, both of whom were formerly with A. M. Crane Co., of Chicago. The company have opened offices at 532 The Rookery, and have shops at 33-35 East Ontario street.

C. H. Hopke, Rockford, Ill., is having plans prepared for a foundry to be built in that city. There will be two buildings, one 150 x 75, and the other 75 x 60.

The Standard Pneumatic Tool Co., Chicago, has removed its general offices, formerly in the Marquette Building, to the new works recently completed at Aurora, Ill.

The Sterling Iron Works, Springfield, Mo., has been incorporated with a capital of $40,000, to conduct a general foundry and machine business. The new company has secured the plant of the Springfield Stove Works, and will add a new building 50 x 120 feet, to be used as a blacksmith shop and boiler house. New machinery is being installed, and it is expected the plant will be in operation about Dec. 1. The officers of the company are: H. C. Mosher, president; H. T. Hornsby, vice-president and treasurer; R. P. Bowyer, secretary.

Pawling & Harnischfeger, Milwaukee, Wis., have received an order for a 10-ton electric crane from the George H. Smith Casting Co., 500 Clinton street, Milwaukee.

The Simplex Railway Appliance Co., Hammond, Ind., manufacturers of car bolsters, reports that its sales for the month of October were the largest of any one month since it began business, and were twice as large as the corresponding month of last year.

The National Foundry & Manufacturing Co., Terre Haute, Ind., has been incorporated with a capital stock of $25,000. The incorporators are John B. Bergman, William B. Graham and B. F. Brown.

Edward Cochran and R. G. Crawford, Sterling, Ill., have had plans prepared for a foundry to be built in that city. The building will be 50 x 75 feet.

The plant of the Chicago Brass Co., located at Kenosha, Wis., passed into the hands of the American Brass Co., last week. As soon as the transfer was made the Kenosha company reorganized by electing the following officers: President, Charles F. Brooker of New York; vice-president, A. P. Hine of Torrington, Conn.; treasurer and general manager, F. L. Tittsworth of Kenosha; secretary, W. S. Houston of Chicago; superintendent of the mills, J. K. Fletcher of Kenosha.

General Industrial Notes:—

Much of the machinery of the Pomeroy, O., plant of the American Steel Hoop Co., which is being dismantled, will be shipped to the Union mills of the company at Youngstown, O.

Suit has been commenced against the Lackawanna Iron & Steel Co., Scranton, Pa., by ten millers located along the Quittahahilla creek, where 250 coke ovens have been erected, and which necessitated the damming of the creek. The millers ask $100,000 damages for loss of water.

The charcoal furnace of the Pacific Steel Co., located at Irondale, Wash., was placed in operation last week. The furnace has a capacity of 50 tons daily. The iron ore which is used in the furnace comes from the mines on Texada Island, off the coast of British Columbia.

The puddling mill of the new Eleanor Iron & Steel Co. at Irwin, Pa., is fast nearing completion, and will be placed in operation about the middle of December. It will have a capacity of 92 tons daily. The finishing mill is also well under way and will probably be placed in operation shortly after the first of the year.

The British Westinghouse Electric & Manufacturing Co. has been awarded the contract for the erection of a large electric plant by Bolckow, Vaughan & Co., of Cleveland, England. As far as possible the entire steel plant will be operated by electricity.

The Scott Street mill of the American Steel & Wire Co. at Joliet, Ill., is closed for repairs. Rod mills, Nos. 1, 2 and 3 of the Illinois Steel Co., at Joliet, Ill., are also under repairs.

The plant of the El Paso Iron Foundry Co., at El Paso, Tex., has been purchased by the Mines & Smelter Supply Co., of Denver, Col.

A strut weighing 62 tons was recently cast at the plant of the American Steel Casting Co., Chester, Pa.

The Wolff & Zwicker Iron Works at Portland, Ore., have been purchased by Drake C. O'Reilly and H. N. Burnee for $40,000. The entire plant, with the exception of the foundry, will be immediately dismantled. It is probable that the latter will be operated.

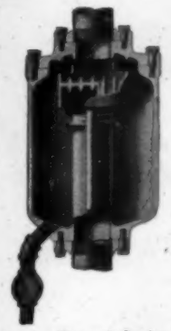
The new plant of the Connellsville Manufacturing & Mine Supply Co., located at Greenwood, Pa., across the river from Connellsville, is fast nearing completion and much machinery is already installed. The company is now receiving orders for mine pumps, mine and coke works machinery and equipment. It is possible that the company will take over the business of Kenney & Co., at Scottdale, Pa., although nothing definite has been done in the matter.

The Crescent Manufacturing Co., of Connellsville, Pa., has recently purchased valuable patents on automatic grease guns and sight lubricators for stationary engines from the Lackawanna Lubricator & Manufacturing Co., of Scranton, Pa.

Contracts for much of the machinery for the new sheet plant of the Rolling Mill Co. of America, at Connellsville, Pa., have already been let. The site has already been surveyed and the contracts for the buildings are soon to be let.

A receiver for the Bess Machine Co., Hamilton, O., has been applied for and a temporary injunction granted to enjoin the company from disposing of any of its property while the litigation is pending.

The purchase of the Cornwall Iron Co.'s plant at Lebanon, Pa., was consummated last week by the Lackawanna Iron & Steel Co. and now every furnace in Lebanon County, Pa., is controlled by the Lackawanna Co. The price paid for the plant was $3,039,000.



Section Through Centre. Vertical Form.

COCHRANE SEPARATORS

ACTUALLY SAVE COAL.

They do this in a manner that is not always appreciated. The primary function of a Cochrane Separator is, of course, to separate water from steam, and to thus prevent accidents to the engine; but in addition to this, the removal of moisture very much reduces the amount of steam used by the engine, as it decreases the loss due to that wasteful phenomena which experts call "cylinder condensation." Each particle of water in the steam in the cylinder absorbs heat obtained from the steam in contact with it—it cannot absorb this heat without taking it from the steam. As the steam is thus robbed of its heat it must condense, and when it is in that state it can perform no work.

Do not, therefore, allow water to enter with the steam, for our **COCHRANE SEPARATORS** will prevent it.

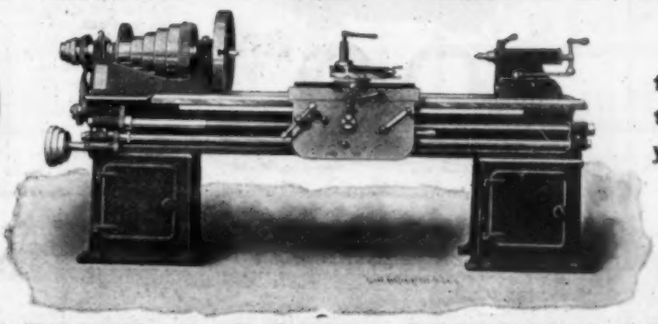
WRITE FOR CATALOGUE.

HARRISON SAFETY BOILER WORKS,

Clearfield & 17th Sts., PHILADELPHIA, PA.

ENGINE LATHES

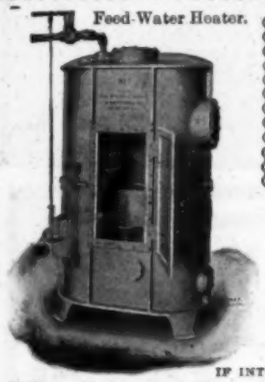
QUALITY COUNTS. OUR LATHES XL ALL OTHERS



Unsolicited letters from first-class shops prove this. Copies of these ar yours for the asking.

We build LATHES EXCLUSIVELY.

SCHUMACHER & BOYE, CINCINNATI, O., U. S. A.



Feed-Water Heater.

Feed Water Heaters

Cut herewith illustrates Stilwell's latest design. **Made entirely of cast iron.** Saves fuel and filters the feed water for steam boilers. Use only exhaust steam.

BOILER FEED PUMPS

Single, Duplex and Triplex.

AIR COMPRESSORS

Jet - Condensers - Surface

IF INTERESTED ADDRESS

The Stilwell-Bierce & Smith-Vaile Co., 227 Lehman Street, DAYTON, OHIO, U. S. A.

Triplex Boiler Feed Pump.

THE CROSLEN

Automatic Reducing Valve

Will take compressed air, gas or fluid at any high pressure and reduce it automatically to any low pressure with absolute precision. It is absolutely free from leakage. Its delicacy of movement in responding to the slightest adjustment of the index, and the absolute simplicity of its construction commend it to all users of high pressure

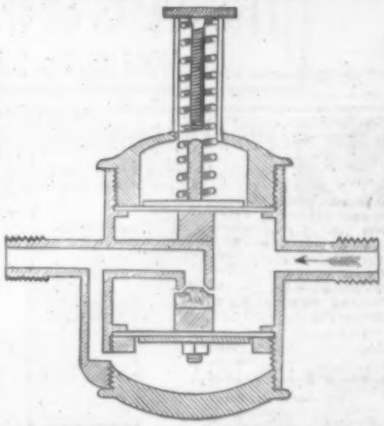
STEAM, AIR AND WATER.

ENTIRELY AUTOMATIC IN ITS ACTION AND POSITIVE IN ITS REGULATION.

Address for Circular

THE CROSLEN MFG. CO.,

119-121 La Salle St., CHICAGO, ILL.



IRON & WOOD-WORKING MACHINERY

U·BAIRD MACHINERY Co.

High Grade, Labor Saving
Machine Tools and
Machinists' Supplies.
123-125 Water St., Pittsburg, Pa.

TRADE MACHINERY MARK

We have a large stock of new and second-hand machinery.

Send for prices and particulars . . .

THE MONTHLY OFFICIAL RAILWAY LIST

Is the oldest, largest and most complete and by far the most widely circulated publication of its kind in the world.

A Complete Directory of the Steam Railways of North America and their Officials and Sub-Officials.

The September issue of the "RED" LIST now out. If you are a railroad official, you should have received your copy; if you have not, write us for it at once.

THE OFFICIAL RAILWAY LIST,
315 Dearborn St., Chicago.

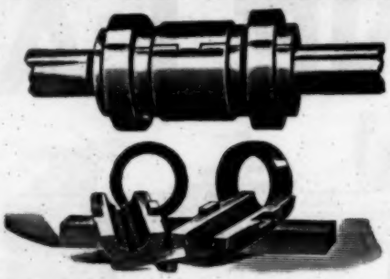
Buy your advertising as you do other material—by comparing prices and quality. Compare the "Thirty Day" List with any other similar publication as regards accuracy and completeness.

THE GEO. B. SENNETT Co., YOUNGSTOWN, OHIO.

MANUFACTURERS OF

SENNETT COMPRESSING COUPLINGS

AND OTHER SPECIALTIES.



We do not claim novelty in these Couplings so much as good material, good workmanship and extreme simplicity. We make them of a very strong cast iron, with wrought iron bands.
We make also the

SENNETT ENGINE
20 to 40 H. P.

Foundry contracts solicited for duplicate castings, from 10 lbs. to 5 tons each.

Every Mill Man
Should Keep Posted by Reading
Power and Transmission

a unique publication in trade literature exclusively devoted to
MODERN POWER TRANSMISSION ENGINEERING
copiously illustrated with typical installations. Other articles of interest to the up to date factory are also contained in each issue. Sample copy free by applying to
THE DODGE MANUFACTURING CO. ENGINEERS FOUNDERS MACHINISTS MISHAWAKA, IND. U.S.A.
BRANCHES ~ BOSTON, NEW YORK, CHICAGO, CINCINNATI, ATLANTA, LONDON, ENG.

Sheet Shears,
Squaring Shears,
Shear Knives.
Your inquiries are solicited.

Pittsburgh Shear Knife and Machine Co.,

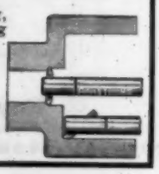
PITTSBURGH, PA.

The ABC of Iron,
NOW $1.00.

IDEAL MANUFACTURING CO.
Tool Makers and Machinists,
18-30 W. Randolph St. Chicago, Ill.

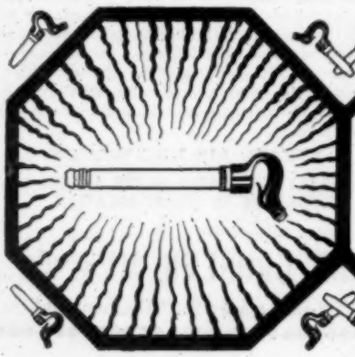
YOU CAN LEARN HOW

to avoid the expense and loss incident to the use of the forged lathe and planer tools if you will investigate the Armstrong system of inserted cutters of self-hardening steel, for Turning, Planing, Boring and Cutting off metals.



Keep posted.
Write for Catalogue.

Armstrong Bros. Tool Co.,
"The Tool Holder People,"
CHICAGO, ILL., U. S. A.

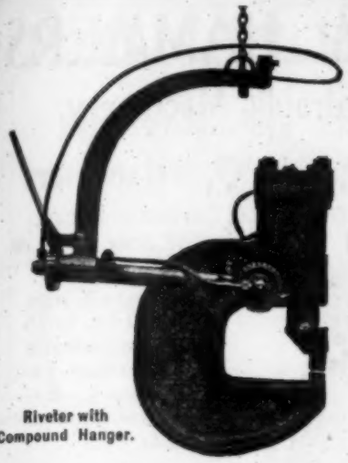


SOME POINTS
··ABOUT··
CLEVELAND PNEUMATIC TOOLS

Utmost efficiency. Great durability
Freedom from repairs. Simplicity.

They have many other good points, all described in our catalogue. Write for it.

THE CLEVELAND PNEUMATIC TOOL C O
74 FRANKFORT STREET,
Cleveland, O.



Riveter with Compound Hanger.

R. D. WOOD & CO.,

400 Chestnut Street, PHILADELPHIA, PA.

HYDRAULIC RIVETERS, Fixed and Portable.

PUNCHES, SHEARS, CRANES, PRESSES AND LIFTS.

Hydraulic Valves. Cast Iron Pipe.

MATHEWS FIRE HYDRANTS.

Gate Valves. Valve Indicator Posts. Pumping Engines. Producer Gas Plants.

Quick Work Good Work

ELASTIC ROTARY BLOW RIVETING MACHINE

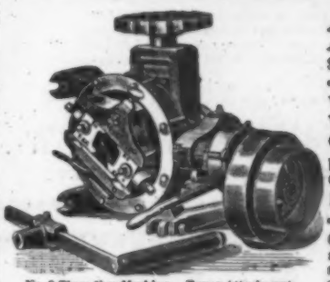
Strikes 3,000 blows per minute. . . . For riveting Hardware, Bicycle Chains, Agricultural Implements, Mechanics' Tools, etc. . . . . .

MANUFACTURED BY

F. B. Shuster Co.

NEW HAVEN, CONN.

Water, Gas *and* Steamfitters' Tools



No. 0 Threading Machine. Power Attachment.

ARMSTRONG Adjustable Stocks and Dies.

Vises (hinged), Improved Wrenches, Pipe Cutters, Clamp Dogs, etc. Improved Pipe Threading and Cutting-off Machines. . . Hand or power. . .

Our No. 0 machine is designed for threading the smaller sizes of pipe—iron or brass—also bolts.

The **ARMSTRONG MFG. CO.,**

Bridgeport, Conn.

No. 56 Hand Machine. Range 2½-6 in. R. H.

FORBES PATENT DIE STOCK

and one man can with ease cut off and thread 12-inch pipe.

Smaller Sizes Proportionately Easy.

Send for Catalogue.

The Curtis & Curtis Co.

37 Garden St., BRIDGEPORT, CONN.

HYDRAULIC JACKS

Tube Expanders, Hydraulic Punches, Screw Punches.

A. L. HENDERER'S SONS,

708 Maryland Ave., Wilmington, Del.

ELEVATORS AND CONVEYORS

FOR

Slag, Ore, Skelp, Bar Iron, Coal, Ashes, Pig Iron, etc.

POWER TRANSMISSION

LINK-BELT MACHINERY CO.

CHICAGO.

Philadelphia: Link-Belt Engineering Co.

THE McKIM GASKET

Made of packing encased in soft annealed copper. **Cannot Blow Out. Can be reapplied indefinitely.** All sizes for manhole, handhole and pipe fittings.

McKim Seamless Copper Ferrules are the best Ferrules made.

Write for prices and catalogue.

McCORD AND COMPANY,

1478 Old Colony Bldg., Chicago. 1905 American Surety Bldg., New York

THE NEW JACKSON HAND-POWER ROCK DRILL

Made entirely of Steel. Guaranteed against breakage for two years. Saves time, labor, steel.

DOES IT SAVE?

WELL, READ THIS!

A Record in Hardest of Granite.

GOLDEN, COLO., June 17, '01

I have used one of your Jackson Hand Power Rock Drills for some months in the hardest rock in Jefferson County, Colorado, and I want to say that the drill is a perfect success—is a time saver and a money saver. One man with a Jackson Drill does as much work as three men can do in the old way.

Two men drilling by hand in the old way would do well to make 15 inches in two hours, but with the Jackson Drill one man makes 63 inches in two hours, and does not work any harder than a miner usually works.

I consider that a man cannot afford to do mining any longer in the old way. Yours very respectfully,

S. MEYERS.

RAWLINS, WYO., June 19th, 1901.

H. D. Crippen, Esq.,

Dear Sir:—We are driving a tunnel through the hardest kind of crystallized limestone, and when we got your drill, we were about at a standstill. I consider it a perfect success. I can safely say that the advantage the Jackson Drill has been to us the month we have used it amounts to more than the cost of the drill.

Yours respectfully,

W. S. HILANDS.

It will pay you to obtain catalogue 14, just issued, which gives full details as to construction, etc. Also record of drill in all grades of rock. Will mail on application.

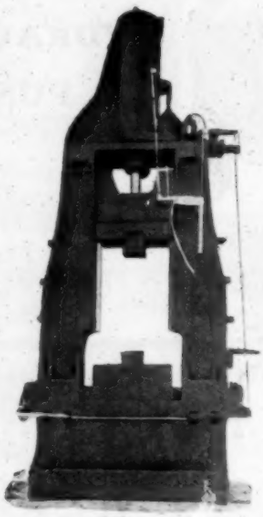
MANUFACTURED BY

H. D. CRIPPEN, 52 Broadway, NEW YORK CITY.

DENVER OFFICE: 1756 LARIMER STREET

STEAM HAMMERS

and Hydraulic Machinery.



7000 pound Steam Drop Hammer.

Our Hammers are of the NEWEST AND MOST IMPROVED TYPE made in all sizes from 200 lbs. to 25 tons falling weight, and for every variety of work. Every size of hammer is made with

Steel Frames

for most severe service. We also make hydraulic

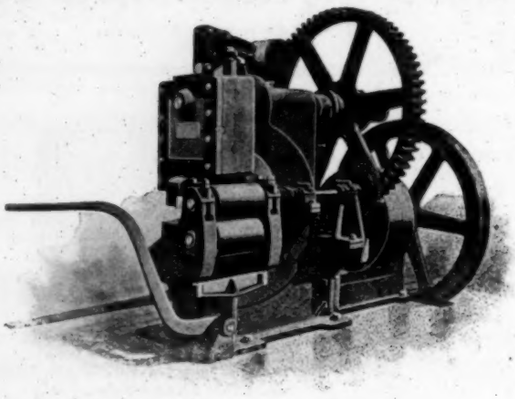
RIVETERS,
CRANES,
PRESSES,
ACCUMULATORS.

Send for catalogue and photographs.

Chambersburg Engineering Co.

CHAMBERSBURG, PA.

United Engineering & Foundry Company,



No. 2 VERTICAL SHEAR.

SUCCESSOR TO

McGill & Co., The Lloyd Booth Company, Lincoln Foundry Co. and Frank-Kneeland Mach. Co.

Manufacture

Sand, Chilled and Steel Rolls.

Complete Equipment for

Steel and Iron Works and Tube Plants.

General Office: 54th St. and Ave. R. R.
Branch: 406 Bank Commerce Bldg., PITTSBURG, PA.

HOISTING, CRUSHING AND MINING MACHINERY.

EARLE C. BACON, Engineer,
Havemeyer Building,
NEW YORK.

Send for Catalogues.

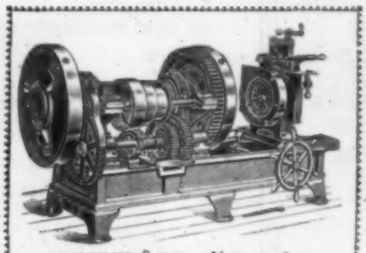
FARRELL Ore and Rock CRUSHERS.
BACON'S Hoisting Engines, Rolls, Gravity Incline Machinery, etc.

IT PAYS TO ADVERTISE IN THE IRON TRADE REVIEW.

That is the testimony of the shrewdest and livest of them.

BIGNALL AND KEELER MFG. CO.

Pipe Threading Machinery for Tube Mills and General Manufacturing Purposes, from ¼ in. to 18 in. for Hand and Power.



DUPLEX NO. 8 IMP. 2½ IN. TO 8 IN.

Hand Emery Surfacers.
Combination Vises.
Rolling Pipe Cutters.

Office and Works:
Edwardsville, Ill., U. S. A.

When you write to firms who advertise in our columns, please mention the fact that you took their address from our paper. They will thank you for it.

MOLDERS' TEXT BOOK.

Being Part II of American Foundry Practice, giving the best methods and rules for obtaining good castings, with detailed description for making molds. A thoroughly practical book that should be in the hands of every molder. By Thomas D. West. 460 pages, cloth $2.50

The Iron and Steel Press Co.
CLEVELAND, O.

COVER YOUR GROUND

When you send a salesman out on the road to stir up the foundry trade, hand him a copy of

Penton's Foundry List

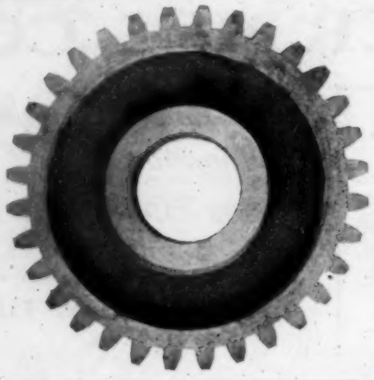
in order that he may cover his ground properly.

He will be saved the annoyance of hunting up people who have no foundries and be made acquainted with others whom your competitors have very likely missed.

If you want to cover a certain territory with mail matter you should address it from *Penton's Foundry List.* It is the only way you can be sure of reaching all engaged in the business.

Any way you look at it you cannot afford to be without a copy of *Penton's Foundry List.*

The **FOUNDRY** | 1064 ROSE BUILDING CLEVELAND, O., U.S.A.



To Your Interest

to communicate with us before placing orders for Gears.

Nuttall Cut and Planed Gears

have admitted economical advantages that commend them to all users of Gears.

Write for estimates and facts.

R. D. Nuttall Company
PITTSBURG, PA.

GEAR CUTTING

Spur Gears,
Bevel and Mitre Gears,
Worm Gears,
Spiral Gears,
Internal Gears.

¼ to 50 inches diameter.
48 Diametral to 2 inch Circular pitch.

F. H. BULTMAN & CO.,
100-108 Canal Street, - - - CLEVELAND, O.

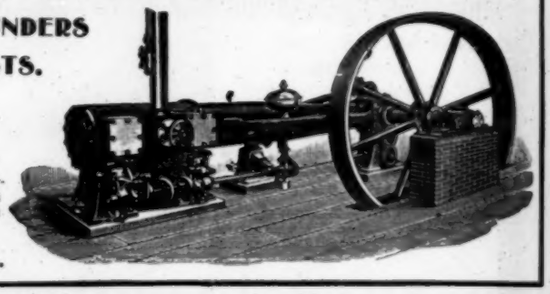
THE I. & E. GREENWALD CO.

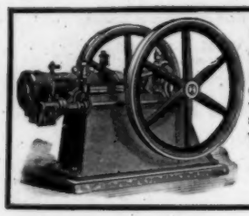
ENGINEERS, FOUNDERS AND MACHINISTS.

Steam Engines,
Shafting, Hangers,
Pulleys, Sprocket
Wheels, Chains, etc.

Headquarters for Mill Gearing of all kinds and sizes
Steam power plants complete

720 East Pearl St.,
CINCINNATI, O.





GAS AND GASOLINE ENGINES

Cheap and convenient power for any service.

Write for Catalog 21.

COLUMBUS MACHINE CO.,
COLUMBUS, O

Excelsior Straight-Way Back Pressure Valve

This valve has no dash pots, springs, guides or complicated levers to get out of order. It is simple, reliable and well made Never sticks, and can be relied upon at all times when using exhaust steam for heating; or when used as a relief, or free exhaust on a condensing plant, it has no equal. It is noiseless and free from any complicated attachments.

JENKINS BROTHERS, NEW YORK PHILADELPHIA BOSTON CHICAGO

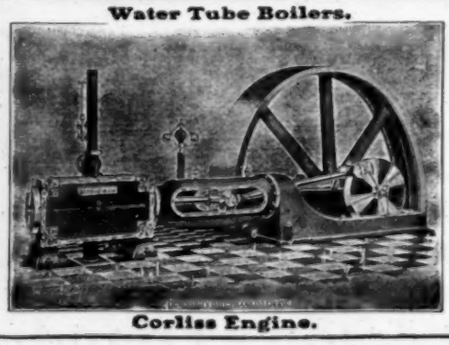
Machinery For Reducing and Pointing Wire

By Compression or Cold Swaging.

Especially adapted to Pointing Wire Rods and Wire for Drawing. For machines or information, address

S. W. GOODYEAR,
Waterbury, Conn.

Water Tube Boilers.



Corliss Engine.

Complete Wire and Rod Mills.

Engines for Rolling Mills and Electric Railways.

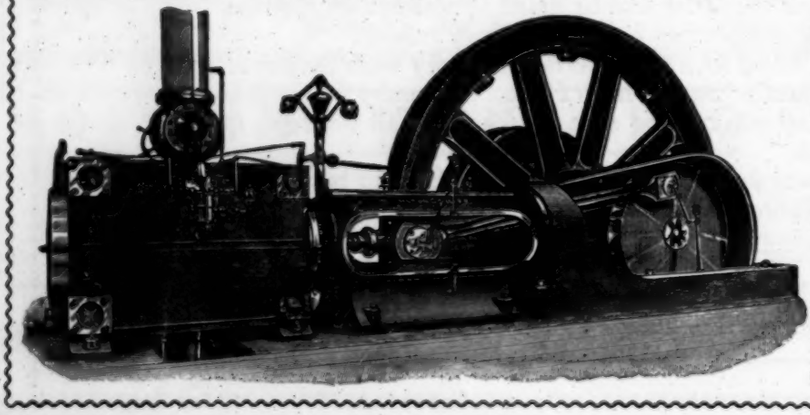
Waste Heat Boilers.

G. A. MULLINS,
226 La Salle Street,
CHICAGO.

The ABC of Iron,

NOW $1.00.

THE HOOVEN, OWENS, RENTSCHLER CO., *Hamilton, Ohio.*



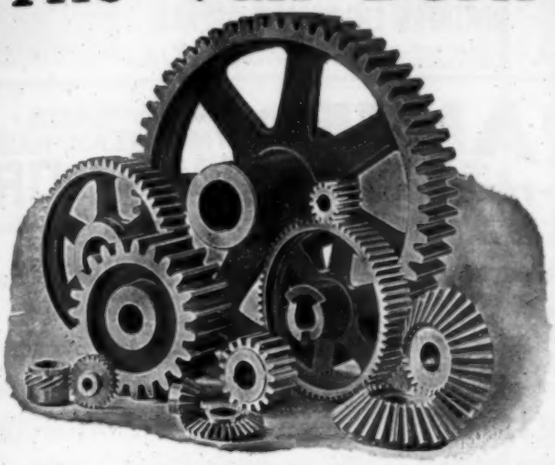
Hamilton Corliss Engines.

Engines for ROLLING MILLS, ELECTRIC RAILWAYS and ELECTRIC LIGHT.

ENGINES OF ALL SIZES AND FOR ALL PURPOSES.

46 South Canal St., Chicago.
39 and 41 Cortlandt St., New York.
Laclede Bldg., St. Louis, Mo.
C. C. Moore & Co., San Francisco, Cal.

The Van Dorn & Dutton Co.,



GENERAL MACHINISTS AND ENGINEERS,

Manufacturers of

CUT GEARS and PINIONS.

Spur Gears, Spiral Gears, Bevel Gears, Worms and Racks.

GEAR CUTTING
OF ALL DESCRIPTIONS.

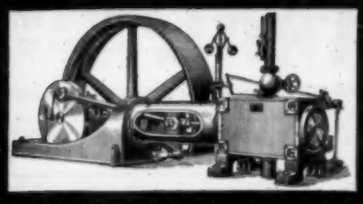
Teeth Planed in Bevel Gears Theoretically Correct by Latest Improved Machinery.

MATERIAL AND WORKMANSHIP THE BEST.

Write for Estimates and Prices.

CLEVELAND, O.

ALLIS-CHALMERS CO.,



Builders of

REYNOLDS CORLISS ENGINES.

PUMPING, BLOWING AND HOISTING ENGINES.

General Offices: CHICAGO. Home Ins. Bldg.

WE CONVEY AND ELEVATE EVERYTHING.

TACKS, SAND, ROCK, ORES, RED HOT IRON, MOLTON SLAG, COAL AND SALT.

CONVEYORS AND ELEVATORS MADE BY

C. O. BARTLETT & CO.
CLEVELAND. O.

Southwark Foundry & Machine Co.

PHILADELPHIA PA.

Porter-Allen Automatic Engines,
Blowing Engines, Centrifugal Pumps,
Weiss Counter-Current Condensers.

M. ALLEN, President.
WM. B. FRANKLIN, Vice-President.
F. B. ALLEN, Second Vice-President.
J. B. PIERCE, Secretary and Treas.

HARTFORD STEAM BOILER INSPECTION AND INSURANCE CO.

HARTFORD, CONN.

BURWELL & BRIGGS, General Agents,
32 and 33 Clark Bldg.,
208 Superior St., CLEVELAND, O.

C. A. BURWELL, Chief Inspector,
32 and 33 Clark Bldg.,
208 Superior St., CLEVELAND, O.

J. E. WOLCOTT, Special Agent,
32 and 33 Clark Bldg.,
208 Superior St., CLEVELAND, O.

The William Tod Co.

YOUNGSTOWN, OHIO.

The PORTER-HAMILTON ENGINE

Reversing Engines, Blowing Engines, Converters, Hydraulic and special heavy machinery for the iron and steel trades.

Park Building, PITTSBURG, - - Seward S. Babbitt.

☞When writing to advertisers please mention THE IRON TRADE REVIEW.

JEFFREY ELEVATING CONVEYING MACHINERY

Coal Handling, Screening, Coal Mining, Coal Washing, Crushing Machinery. Our appliances will save you money.

SEND FOR CATALOGUES.

The Jeffrey Mfg. Co.,
COLUMBUS, OHIO.
New York. Denver.

CRANES OF ALL DESIGNS
Traveling, Jib, Locomotive.
CRANES are our Specialty.
NORTHERN ENGINEERING WORKS,
C. E. STAMP & CO., Cleveland Agts., New England Building. No. 6 Chene St. DETROIT, MICH.

CRANES •MACHINERY FOR HANDLING • HIGH • SPEEDS • •ELECTRIC•STEAM•HAND• **COAL AND ORE**
THE BROWN HOISTING MACHINERY CO. Works, Cleveland, O.
NEW YORK, 26 Cortlandt Street. LONDON, 39 Victoria Street, S. W.

The Exeter Machine Works,
PITTSTON, PA.
CLEVELAND OFFICE: 707 NEW ENGLAND BUILDING. NEW YORK OFFICE: 15 CORTLANDT ST.
Manufacturers of
Hoisting Engines For Contractors and Mines.
Elevators and Conveyors For Power Houses, Coal Yards and Mines.

THE CLEVELAND CRANE AND CAR CO
CRANES OF ALL KINDS FOR ALL PURPOSES
SUPERIOR ST. CLEVELAND O.

Overhead Tramrail Systems
ARE GREAT LABOR AND TIME SAVERS.

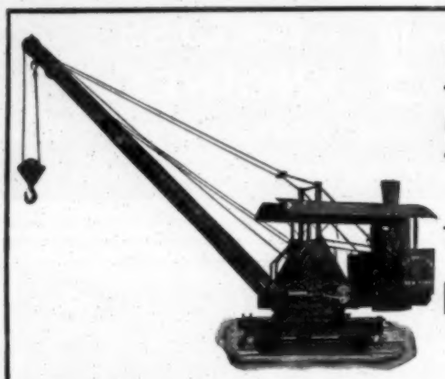
THE KIND which we make are especially adapted for use in

FOUNDRIES, MILLS AND SHOPS.

Which is the better plan, to have laborers stumbling over each other trying to carry a ladle or heavy piece of material around the shop or handle it with one of our tramrails in half the time and with half the number of men?

We can tell you all about it if you will write us for our new illustrated catalogue.

J. W. Moyer & Co.
1730 Howard St., PHILADELPHIA, PA.
NEW YORK OFFICE: 730 Park Row Bldg.



LOCOMOTIVE CRANES
IN CAPACITIES
THREE TO FIFTY TONS
INDUSTRIAL WORKS,
BAY CITY, MICH.

THE RIVER MACHINE & BOILER CO., Cleveland, Ohio,
Manufacture all kinds of machinery for Stone Quarries, Channel Machines, Saw Gangs, Hoisting Machinery and Derricks of all kinds, also Rolls, Helve Hammers and Axe Machinery. Special attention is given to designing and building special machinery. Boilers, Tanks, Smoke Stacks and every variety of Sheet Iron Work promptly furnished.

HYDE WATER TUBE SAFETY BOILERS.
Best for Utilizing Waste Heat from Heating Furnaces, Puddling Furnaces, Blast Furnaces.
THE ONLY BOILERS WITH PERFECT CIRCULATION.
HYDE BROS & CO., PITTSBURGH, PA.

The Iron Trade Review
Pays special attention to iron ore, blast furnaces, rolling mill, foundry and machine shop interests. It pays to advertise in it.

STEEL CONSTRUCTION
IN ALL BRANCHES

BUILDINGS DESIGNED AND ERECTED
In all parts of the world
Roof Frames and Trusses Blast Furnaces and Steel Works
Cupolas, Ladles and Converters
Boilers, Tanks and Heavy Plate Work

RITER-CONLEY MFG. CO.
PITTSBURG, PA.

ROLLING MILL ENGINEERS.

Continuous Mills for the economical production of Small Billets, Bars, Rods, Hoops and Cotton Tie.

WIRE DRAWING MACHINERY.

Morgan Construction Co.,
WORCESTER, MASS.

THE RETORT COKE OVEN CO.

Engineers and Contractors for
RETORT COKE OVENS
With or without recovery of by-products

JOHN F. WILCOX, General Manager and Chief Engineer
General Offices: New England Bldg., CLEVELAND, O.

ALEX. LAUGHLAN & CO.
ENGINEERS AND CONTRACTORS
702-706 LEWIS BLOCK ::: PITTSBURG, PA.

WALTER KENNEDY
CONTRACTING AND CONSULTING ENGINEER
611 Penn Ave., PITTSBURG, PA.
Long Distance 'Phone 3174.

THE CHASE MACHINE CO.
111 ELM STREET, CLEVELAND, O.
Hoisting, Car Hauling, Docking and Automatic Towing Engines. Builders of the well known WOOTTERS GAS AND GASOLINE ENGINES.

THE WELLMAN-SEAVER ENGINEERING CO.
CONSULTING AND CONTRACTING ENGINEERS

New England Bldg.
CLEVELAND, O., U. S. A.

Cable Address
"WELLSEA" CLEVELAND

Steel Works, Rolling Mills, Metallurgical Furnaces, Manufacturing Buildings, Machinery for the most economical handling of all kinds of material.

Sole manufacturers of FORTER WATER SEALED REVERSING VALVES and FRASER-TALBOT MECHANICAL GAS PRODUCERS.

LONDON OFFICE: 47 VICTORIA STREET, WESTMINSTER

JULIAN KENNEDY, ENGINEER
PITTSBURG, PA.

MACHINERY FOR THE ECONOMICAL
PRODUCTION OF IRON AND STEEL

CONSULTATION AND EXPERT WORK IN
GENERAL ENGINEERING PRACTICE
CABLE ADDRESS "ENGINEER PITTSBURG"

IRON CITY ENGINEERING COMPANY
Successors to Fessenden & Eidinger
ELECTRICAL ENGINEERS AND MANUFACTURERS' AGENTS
Electric Light and Power installations. Generators, Motors, Arc Lamps, Engines and Boilers, Electric Supplies. Bell 'Phone L. D. Court 1599. P. & A. 'Phone Maine 1376. 410 Penn Ave., Pittsburg, Pa.

S. V. HUBER & CO.
CONSULTING ENGINEERS

Blast Furnaces, Bessemer and Open Hearth Steel Works, Continuous Mills, Hoop Mills, Merchant Mills, Automatic Mill Tables, Labor Saving Devices relating to Rolling Mills, Steam and Hydraulic Machinery.

Ferguson Bldg., PITTSBURG, PA.

EDWARD E. ERIKSON, Conestoga Building, PITTSBURG, PA.
Regenerative Gas Furnaces and Water Seal Gas Producers.
Produces Gas under Tubular Boilers, saving 20 per cent in fuel. NO SMOKE.

DAVID LAMOND
Contracting Engineer
FERGUSON BLOCK, :: :: :: PITTSBURG, PA.
Blast Furnace Construction
AGENT FOR C. H. FOOTE PATENT 2 AND 4 PASS FIRE BRICK STOVE

Duff's Patent Water Seal Gas Producer
OVER 2,200 IN SUCCESSFUL OPERATION.
INVESTIGATION SOLICITED.
THE DUFF PATENTS CO., 608-609 Empire Bldg., PITTSBURG, PA.
Long Distance Telephone, 1898 Pgh.

Steel Works and Rolling Mill Engineers

Garrett-Cromwell Engineering Co.
New England Building :::::::: CLEVELAND, O.

Newark Iron & Steel Co., NEWARK, OHIO.

Open Hearth Steel Castings, Forge Steel, High Pressure and Hydraulic Fittings, Oil Well Specialties, Castings Made True to Pattern and Uniform.

LONG DISTANCE 'PHONE 358. Orders Solicited. Promptness and Reasonable Prices Our Motto.

HIGH GRADE GRAY IRON AND SEMI-STEEL CASTINGS

For Hydraulic Presses and other high pressure work.

SALAMANDER IRON

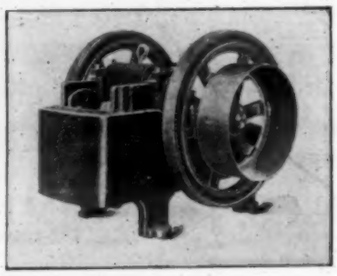
For resisting heat, guaranteed to stand fire test three times greater than ordinary gray iron.

Electrical Castings of Guaranteed Magnetic Power

BROKEN MACHINERY WELDED.

Davis & Ludwig Foundry Co.

240-256 Root Street, - CHICAGO, ILL.



The **BLAKE**

Rock and Ore CRUSHERS

Manufactured by

WM. YAGLE & CO., Ltd.,

32d Street and A. V. Ry., PITTSBURG, PA.

Formerly manufactured by The Robinson-Rea Manufacturing Co.

Repair Parts Furnished. Prompt Deliveries.

Write for Illustrated Pamphlet.

An effective ad. sells goods.
An ad. must reach buyers or no sale.

THE IRON TRADE REVIEW

goes to men who own machinery and must buy more.
The moral is: Write for rates. Here hesitation is loss.

BRASS FOUNDERS FINISHERS J. J. RYAN & CO.,

68-74 West Monroe St., CHICAGO.

Best Bronze, Babbitt Metals, Brass and Aluminum. CASTINGS ON SHORT NOTICE.

MALLEABLE

Buhl Malleable Co.,
DETROIT, MICH.

CASTINGS.

COVERT MFG. CO.,

West Troy, N. Y.

"YANKEE" SNAPS

Made in Styles and Sizes.

For Sale by Jobbers at Manfrs. Prices.

COVERT MFG. CO., West Troy, Y. Y., U.S.A.

Strictly Chemically Pure Acids and Aqua Ammonia,

ESPECIALLY ADAPTED TO LABORATORY WORK.

MANUFACTURED BY

THE GRASSELLI CHEMICAL COMPANY,

General Office and Principal Works, CLEVELAND, O., U. S. A.

STOCKS AT

Tremley, N. J., New York Office, 63-65 Wall Street.
St. Louis, Mo. Cincinnati, O. Milwaukee, Wis. St. Paul, Minn.
Beaver Falls, Pa. East Chicago, Ind. Birmingham, Ala.
Philadelphia, Pa.: Wm. M. Wilson's Sons, 225 Dock Street.
Baltimore, Md.: James Thurston, 210 Buchanan's Wharf.
Chicago, Ill.; James H. Rhodes & Co., 42-44 Michigan Ave.

TINDEL-MORRIS COMPANY, EDDYSTONE, PA.

Chicago Office, A. M. Castle & Co., 54 S. Canal St. Boston Office, Harrington, Robinson & Co., 272 Franklin St.

STEEL FORGINGS

Railroad, Marine and Machine. All Shapes. Heavy Shafting. In the rough, rough turned or finished.

IF YOU MELT IRON You should read "METHODS OF CHEMICAL ANALYSIS AND FOUNDRY CHEMISTRY," by Frank L. Crobaugh. Chemistry is now playing an important part in the determination of mixtures for castings, and for your own protection you should at least have a speaking acquaintance with this subject. A dollar and a half secures you this book, postpaid.

THE IRON TRADE REVIEW, Cleveland, O.

Patterns for Castings.

THE BALKWILL PATTERN WORKS, CLEVELAND, OHIO.

We also make a specialty of Wood Models for machinery, and have had considerable experience in this line of our business.

Tropenas Department

Steel Castings,

25 LBS. AND UNDER.

Estimates given on not less than 100 from each pattern.

THE SARGENT CO.,

687 Old Colony Bldg., CHICAGO.

TROPENAS STEEL PROCESS

With one 2-Ton Converter, makes Castings from 1 oz. to 10,000 lbs.

Sole Agents: POWELL & COLNE, 11 Broadway, NEW YORK

AVERAGE OF 22 TESTS MADE BY U. S. GOVERNMENT.

Sulphur .035%. Ph. .050%.
Elastic Limit 34374. Tens. Strength 67722.
Elongation 33, 36%. Reduct. of Area 46, 4%.
Bent Cold 186 Degrees as Above.

11 PLANTS IN U. S. AND CANADA.

MONONGAHELA IRON & STEEL CO.,

Manufacturers of

Charcoal Bar Iron **CARTER BRANDS** Charcoal Iron Chain

ALL SIZES.

United States Government Specifications Guaranteed. PITTSBURGH, PA.

THE CHAMPION RIVET CO.,

CLEVELAND, O., U. S. A.

VICTOR RIVETS Boiler and Structural.

Finish Unexcelled. Quality Highest Standard.

GOVERNMENT WORK A SPECIALTY.

FORGINGS

PIG IRON, COAL, COKE, PILLING & CRANE.

PHILADELPHIA OFFICE, Girard Building. Lewis Block, PITTSBURG.

Geo. C. Davis,

39 South 10th St., PHILADELPHIA, PA.

CHEMIST AND METALLURGIST.

CLEVELAND RIVET & FORGING CO.

MANUFACTURERS OF

EAGLE RAILROAD FORGINGS. RIVETS SPECIAL FORGINGS BRAND

CLEVELAND, OHIO.

An Open Letter

TO USERS OF NUTS AND BOLTS:—

We take this means of advising you that we make a specialty of prompt shipment at lowest prices, on standard sizes of Hot-Pressed Nuts (Elastic or Common); Machine Bolts; Track Bolts; Structural Rivets, etc. Our Elastic Self-Locking Steel Nut grips the bolt as it is wrenched on, and never works loose like the ordinary nut. For use on Cars, Track, Bridges, Machinery, etc. where nuts must stay, it is greatly superior to the common nut and costs less. Our Elastic Nut Track Bolt makes the best and cheapest rail fastening. We invite you to write for booklet, prices, etc.

Yours truly,

National Elastic Nut Co.

Per T. L. PAINE, Mgr.

Milwaukee, Wis.

GALVANIZED IRON: Its Manufacture and Use.

A Detailed Description of the Industry and its Manufacturing Processes.—By JAMES DAVIES.

139 PAGES, 8vo, CLOTH, $2.00. Sent postpaid on receipt of price by THE IRON AND STEEL PRESS CO., 1064 Rose Bldg., Cleveland, O.

H. C. FRICK COKE CO.,

Post Office
PITTSBURG, PA.

Producers of
Connellsville Coke Only.

"FRICK COKE"

For Blast Furnaces and Foundries; also Crushed Connellsville Coke (substitute for Anthracite Coal) for manufacturing and domestic purposes.

13,500 Ovens.

Daily Capacity 30,000 tons of Coke.

Mines and Ovens in the Connellsville Coke Region, Pennsylvania.

Direct connection with all the railroads entering the region.

Quotations, Freight Rates, Pamphlets giving full information promptly furnished on application.

FOUNDRY COKE

Agents:
General Hocking Fuel Co.,

Connellsville,
Stonega
and
Pocahontas
72 Hour Coke.

O'GARA, KING & CO.

810-820 Old Colony Bldg., CHICAGO.
Exclusive Agents for Roaring Creek & Bellington Railroad Co. of West Virginia. Randolph Smokeless Coal

Exclusive Sales Agents:
Diamond K. Brazil,
Indiana Block.

Youghiogheny,
Piedmont,
Cumberland,
Blossburg.

SMITHING COAL

BESSEMER COKE COMPANY,
Manufacturers of
CONNELLSVILLE COKE,
Furnace, Foundry and Crushed Coke.

MINES AND OVENS IN CONNELLSVILLE REGION.

Direct connections with all railroads entering the region.

Offices: - - Lewis Block, PITTSBURGH, PA.

CAPACITY, 75 CARS DAILY. INDIVIDUAL CARS.

THE BASSETT-PRESLEY COMPANY,
IRON & STEEL.
CLEVELAND, OHIO.
Try our celebrated **CROWN IRON**—3-8 in. to 2 in. carried in stock.

BASIC OPEN-HEARTH STEEL BILLETS, BLOOMS AND SLABS,

Guaranteed Analysis for Rolling Mill and Forging Purposes.

Manufacturers of the **Simplex Car and Track Jacks,**
and dealers in **Pig Iron, Steel and Iron Bars, Springs and Wire.**

A. M. CRANE & COMPANY. THE ROOKERY, CHICAGO.

CLEVELAND & VALLEY B&O SYSTEM **TERMINAL RAILROAD**

Depot foot of S. Water St. / City Office 241 Superior St		Depart.	Arrive.
Akron, Canton & Valley Jct		*7:15 A M	*6:25 P M
Akron, Canton & Marietta		†11:00 A M	†2:10 P M
Akron, Canton, Valley Jct.		*3:25 P M	*9:35 P M
Akron, Canton		*6:30 P M	*11:00 A M
Akron, Canton		*11:30 P M	*8:20 A M
Baltimore & Ohio R. R			
Chicago	and all intermediate st'ns	†7:15 A M	†9:35 P M
		*6:30 P M	*8:20 A M
New York	Pitts. Wash.	*3:00 P M	*10:45 A M
	Balt. Phila.	*11:30 P M	*9:35 P M

†Daily except Sunday. *Daily. Pullman's Palace Vestibule sleeping cars between Cleveland and Chicago; also Washington, Baltimore, and Philadelphia.

L. & R. WISTER & CO., 672 Bullitt Building, Philadelphia, Penna.
Sole Agents for **Dunbar Furnace Company**, Foundry, Forge and Basic Pig Iron, Semet-Solvey and Beehive Coke, Coal; **Saxton Furnace Co.**, Foundry and Forge Pig Iron; **Consolidated Iron & Steel Company**, Bar Iron, Band and Hoop Iron; **American Sheet Iron Company**, Sheet Iron and Black Plate for Tinning. ☞ Buyers and Sellers of all kinds of Iron and Steel Scrap.
BRANCH OFFICE: 331 Fourth Ave., PITTSBURG, PA.

We know the quality of every material which enters into Colonial Paint, because we manufacture all, even making our own oil. Try Colonial Paint on any exposed iron work and notice how much longer it lasts than other kinds.

The Colonial Paint & Varnish Co., Cleveland.

Did You Ever See a Copy of
THE FOUNDRY
the only foundry journal published? SEND FOR ONE FREE.
The FOUNDY, *Cleveland, O.*

Blast Furnace Construction.
ENGINEERS AND CONTRACTORS.
Open-Hearth Furnaces, Heating Furnaces, Soaking Pits, All Kinds Brick Work.

Sole Representatives, U. S. A. Massicks & Crooke's Patent Three Pass Fire-Brick Stoves, with McClure & Amsler's and G. W. McClure's Patent Improvements.
McClure & Amsler's Patent Two Pass Fire-Brick Stoves, with Centre Combustion Chamber.

G. W. McCLURE, SON & CO.,
Smith Bldg., PITTSBURG, PA.

We Manufacture and Erect

STEEL FRAME MILL BUILDINGS

In all parts of the United States.

IRON and STEEL TANKS for Liquids or Gases.

GERM PROOF WATER FILTERS, 10 gal. to 10,000 gal. capacity per hour.

RIVETED STEEL PIPE.

STEEL STACKS.

Wm. B. Scaife & Sons,

(Established 1802.)

PITTSBURGH, - - - PA.

PROOF.

It's easy to make claims; not so easy, always, to prove them. We tell you that

Carborundum Grinding Wheels

cut faster, cut cleaner, last longer than any other abrasive wheels on the market— and here's the proof—

"Carborundum does all you claim for it. For rapidity of cutting and durability, Emery or Corundum cannot compare with it."

[Syracuse Chilled Plow Co., Syracuse, N. Y.]

May we send you the Carborundum booklet?

The Carborundum Company,
Niagara Falls, N. Y.

PERFORATED PLATE SCREENS

AS REQUIRED FOR

Stone, Ore, Zinc, Lead, and all Railroad and Mining Uses.

Special Screens for Coal and Coke.

THE HENDRICK MFG. CO., Ltd.,

Samples and information upon request. Carbondale, Pa.

Who Builds the best Mine Pump?

Prescott.

Fred. M. Prescott Steam Pump Co., Milwaukee, Wis.

- - USE - -

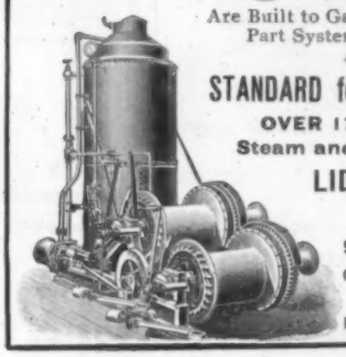
- DIXON'S -

CRUCIBLES.

Joseph Dixon Crucible Co.

Jersey City, N. J.

Lidgerwood Hoisting Engines



Are Built to Gauge on the Duplicate Part System, Quick Delivery Assured.

STANDARD for Quality and Duty.

OVER 17,500 IN USE.

Steam and Electric Hoists.

LIDGERWOOD MFG. COMPANY,

96 Liberty St., New York.

Chicago, Cleveland, Boston, Pittsburg, Atlanta, Philadelphia, Portland, Oregon, New Orleans

TANK CARS.

Girard, Ohio **GIRARD BOILER & MFG. CO.**

THE ENTERPRISE BOILER COMPANY, YOUNGSTOWN, OHIO.

DRAUGHT STACKS, BLAST FURNACES AND HEAVY PLATE WORK A SPECIALTY. ☞ WRITE FOR ESTIMATES.

PHOENIX HORSE SHOES Are the Best Shoes Made. CATALOGUE SENT ON REQUEST.

PHOENIX HORSE SHOE CO., POUGHKEEPSIE, N. Y.—JOLIET, ILL.

FOR Bridges, Factory Buildings, Oil, Gas or Water Tanks, Steel-Frame Structures, Steamships, Steamboat Hulls, Railroad Cars, Smoke Stacks, Blast Furnaces, Mill Buildings, Metallic Roofs and Wood or Metal Surfaces of any kind.

There is no protective so

Efficient, Enduring or Economical as

WISCONSIN GRAPHITE PAINT.

IT RESISTS FROST OR HEAT, WET OR DRY, Alkalies, Acids, Sulphurous Smoke. It is an ideal protective to all exposed surfaces, and comes in all standard shades of colors.

Samples furnished on application, with catalogue and prices.

Wisconsin Graphite Co.,

413 Market Street, PITTSBURG, PA.

A. Garrison Foundry Co.,

PITTSBURG, PA.,

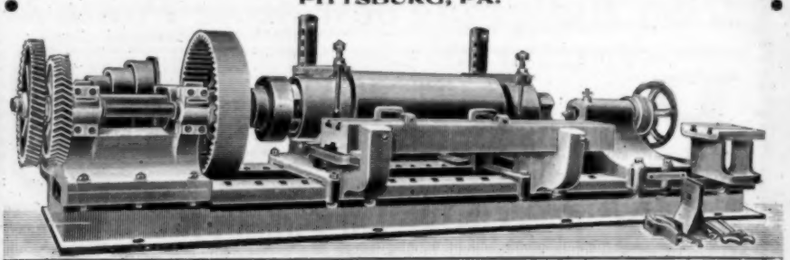
Manufacturers of

SAND and CHILLED ROLLS, and ROLLING MILL CASTINGS

OF EVERY DESCRIPTION.

The George A. Hogg Iron & Steel Foundry Co.,

PITTSBURG, PA.



Aetna and Corliss Rolling Mill Engines, Rolling Mill Machinery, Sand and Chilled Rolls, Freeman Furnace Charger, etc.

THE CHICAGO SCREW CO.

TRADE MARK

SCREWS

94-108 W. WASHINGTON ST. CHICAGO.

Manufacturers of Heavy and Light Electrical Machinery,

The Elwell-Parker Electric Co. of America,

CLEVELAND, O., U. S. A.

Eynon-Evans Steam Jet Blowers

FOR

Gas Producers.

Will IMPROVE both QUANTITY and QUALITY of GAS.

Write us for Information and Catalogue.

We are Specialists in this line.

The Eynon-Evans Mfg. Co.

New York Office, 107 Liberty St.

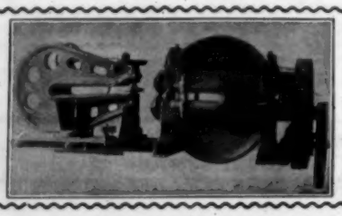
1517-19 Clearfield St., PHILADELPHIA, U. S. A.

CHILLED AND SAND ROLLS. SHEET, TIN PLATE, ROD AND WIRE MILLS.

BRADDOCK MACHINE & MANUFACTURING CO.,

Engineers, Founders and Machinists,

BRADDOCK, PA.



ROLLING MILL MACHINERY

TIN PLATE MACHINERY, CIRCLE CUTTING, PLATE AND BAR SHEARS, STRAIGHTENING MACHINES, McCULLY ROCK CRUSHERS, ETC.

R. S. NEWBOLD & SON COMPANY.

Founders, Machinists and Boiler Makers,

Office and Works, - - - - NORRISTOWN, PA.

BEST MANUFACTURING CO., Pittsburg, Pa.

GULLAND { Best Gate / REGULATING / REDUCING / Heston Blowoff **VALVES**

High Pressure PIPING for POWER PLANTS ERECTED COMPLETE In all parts of the world.

GUN IRON, SEMI-STEEL, AIR FURNACE **CASTINGS** STEEL, BRASS AND CLIMAX BRONZE

Write for Book R.

WEST PENN FOUNDRY & MACHINE CO.,
AVONMORE, PA.

Manufacturers of
TIN, SHEET AND BAR MILL PLANTS.
Blast furnace work. Steel work. Hydraulic machinery. General castings of every description.

E. R. ALLEN,
MANUFACTURER OF
All kinds of soft, fine medium and heavy Gray Iron Castings to order. Boiler, Heater and Architectural Iron Castings a specialty. *Send for Prices and Estimates.*
CORNING, - NEW YORK.

Le Chatelier's
PYROMETER
For measuring temperatures between 0 and 2,900° F.
Recommended by the Highest Authorities.
Successfully used in establishments for the manufacture of

Gas,	Chamotte,
Chemicals,	Cement,
Sugar,	Accumulators,
Terra Cotta,	Incandescent Lamps,
Stone Ware,	Cartridges and Ammunition,
Porcelain,	Glass.

Iron and Steel, Malleable Iron.
Also by Boiler Inspectors, Schools and Colleges, for hardening and annealing steel in roll foundries, etc.
VULCAN MFG. CO., Ltd.,
Pittsburg, Pa.
Station A.

The Lunkenheimer **POP SAFETY VALVES**
For Stationary, Portable and Marine Steam Boilers

Are made of the best materials, provided with large springs, have full relieving capacity, always prompt and reliable in operation. In Brass Top or Angle outlet, ¾ to 3 inch. In Iron, Brass Mounted, Screw or Flange Ends, 2 to 6 inch. Also furnished with Nickel Seats if desired. All valves rigidly tested and inspected and warranted to satisfy.

Specify LUNKENHEIMER MAKE, and order from your dealer

WRITE FOR CATALOG of superior Brass and Iron Engineering Appliances

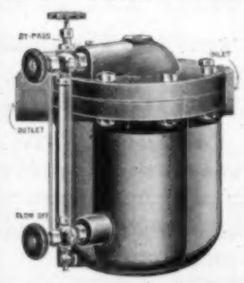
Iron Body. *Brass Top Outlet* *Brass Angle Outlet.*

THE LUNKENHEIMER CO., Sole Makers and Patentees, CINCINNATI, OHIO, U. S. A.
BRANCHES: New York—26 Cortlandt St. London—35 Great Dover St., S. E.

CHILLED ROLLS,
SHEET and TIN MILLS,
Quick Deliveries.
F. R. Phillips & Sons Co.,
PHILADELPHIA, PA.

The Wright Improved Safety Water Column

Commends itself to intelligent steam users by reason of its simple, durable construction and its unfailing efficiency in preventing boiler accidents. A factor for economy as well.



The Wright Emergency Steam Trap

The Trap to be considered if one is wanted which will instantly dispose of any unusual inflow of water. Widely adopted on its merits.

Write for Catalog of the Wright Steam Specialties.

WRIGHT MANUFACTURING CO.
30 SHELBY STREET COR. WOODBRIDGE. DETROIT, MICH.

THE DAILY METAL MARKET REPORT
Published by
THE REPORT CO.,
Room 79, 99 John St., NEW YORK.

Gives daily reports of foreign and domestic metal markets. Shows daily fluctuations in all metals, both in this country and in Europe. Contains the latest news affecting the market for Pig Iron, Steel, etc. Write for sample copy. We guarantee a circulation greater than the combined circulation of all competitors. As an advertising medium for reaching the Iron, Steel and Metal producers and consumers it has no superior.

Now is the time for you to spread out.
Extend your business and create a demand for your devices in new fields.

MOUNT SAVAGE FIRE BRICK

UNION MINING CO.

ESTABLISHED 1841.

CAPACITY,
60,000 PER DAY: 18,000,000 PER YEAR.

The First Manufactory of Its Kind in the United States.

Proprietors of the
Celebrated Mount Savage Fire Brick.
GOVERNMENT STANDARD.

Home Office and Works: MOUNT SAVAGE, Allegany County, Maryland.

Branch Offices: No. 1 Broadway, NEW YORK, N. Y.; Land Title Bldg., Broad & Chestnut Sts., PHILADELPHIA, PA.; Park Building, PITTSBURGH, PA.; Stowe, Fuller & Co., 249 Arcade, CLEVELAND, O.; N. A. Williams Co., 219 E. Washington St., CHICAGO, ILL.

Best material obtainable. Highest Standard attainable. A third of a century of successful experience.

Seven works in two states on three competing trunk lines. One quarter of a million daily capacity.

REESE-HAMMOND FIRE BRICK CO.,

PITTSBURG OFFICE: 912-914 Park Building.
GENERAL OFFICE: Bolivar, Pa.

High Grade Fire Brick
FOR ALL PURPOSES.

Special Attention Given to the Furnace and Foundry and Coke Trade.

Established 1864.

CAPITAL STOCK
$100,000.00.

HIGH GRADE FIRE BRICK

SCIOTO FIRE BRICK COMPANY,
Sciotoville, - Ohio.

DOVER FIRE BRICK CO.,
MANUFACTURERS OF
Fire Furnace, Mill & Special Shape Fire Brick. **Brick**
Office, 508-509 Cuyahoga Bldg.
CLEVELAND, O.

SPECIAL BRICK
For Open Hearth and Bessemer Steel Casting.

SHAPES
Of all kinds made to order.

Our facilities for prompt shipment are unexcelled. Send blue prints or sketches and we will quote satisfactory prices.

THE MANOWN MFG. CO.
GENERAL OFFICES:
Hussey Building, PITTSBURG, PA.

FIRE BRICK
FOR
STEEL WORKS

And all other Purposes. Yearly Capacity 15,000,000.

EVENS & HOWARD FIRE BRICK CO., St. Louis, U.S.A.

A. F. SMITH & CO.,
MANUFACTURERS OF
FIRE BRICK AND CLAY.
BEAVER COUNTY SAND STONE.
Telephone 42. NEW BRIGHTON, PA.

FIRE BRICK. FIRE CLAY. CUPOLA BLOCKS.
OHIO FIRE BRICK CO., Oak Hill, Ohio.

HIGH GRADE FIRE BRICK
The Crown Fire Clay Company,
AKRON, OHIO.
76 Kilns. 75,000 Daily Output.
911 Chamber of Commerce, CHICAGO.

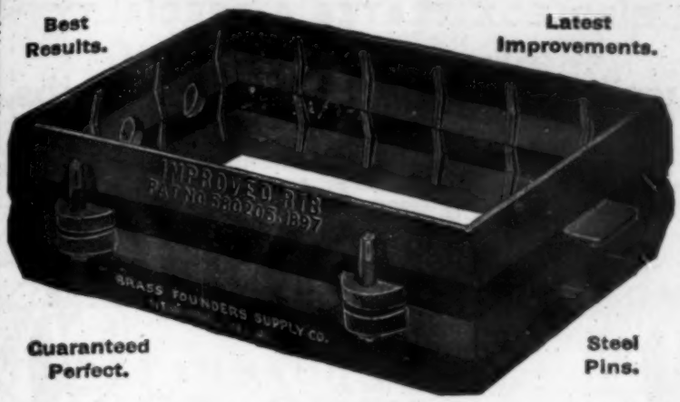
Coal and Coke Crushers

WILLIAMS PATENT CRUSHER AND PULVERIZER CO.,
St. Louis, Mo., U. S. A.

The Oak Hill Fire Brick & Coal Co.
OAK HILL, OHIO,
Manufacturers of the celebrated
O. K. Crown, O. K. and A brands of Fire Brick.

Close attention given to special shapes and sizes. Prompt service and good workmanship guaranteed. We solicit correspondence. Catalog and samples on application.

Chicago Office: 470 The Rookery, Chicago.



Best Results. Latest Improvements.

Guaranteed Perfect. Steel Pins.

LATEST AND BEST

PATENT IMPROVED RIBBED AND BEVELED FLASKS

Wood Snap Iron **FLASKS** For Iron Foundries For Brass Foundries

BRASS FOUNDERS SUPPLY COMPANY

Newark, N. J.

FIRE BRICK

F. B. HOLMES & CO., Detroit, Mich.

Manufacturers and Shippers

Steel, Savage Mountain, Holmes

FIRE BRICK.

Best made for Malleable, Rolling Mill Furnaces and Cupola Linings.

FOUNDRY

FACINGS, SUPPLIES, EQUIPMENTS.

No Orders Too Large for Our Capacity. None Too Small for Our Best Attention.

IMPORTERS AND REFINERS OF

GRAPHITE

AND

CEYLON PLUMBAGO

FOR ALL PURPOSES.

SEND FOR LATEST CATALOG.

THE HILL & GRIFFITH CO.

CINCINNATI, OHIO, U. S. A.

GALVANIZED IRON: Its Manufacture and Use.

A Detailed Description of the Industry and its Manufacturing Processes.—By JAMES DAVIES.

139 PAGES, 8vo, CLOTH, $2.00. Sent postpaid on receipt of price by THE IRON AND STEEL PRESS CO., 1064 Rose Bldg., Cleveland, O.

FOR GREAT TENSILE STRENGTH, ELASTICITY AND ELONGATION, COUPLED WITH UNUSUAL NON-CORROSIVE QUALITIES,

CASTINGS

AND

PROPELLER WHEELS

MADE FROM

Parsons Manganese Bronze

CANNOT BE EXCELLED.

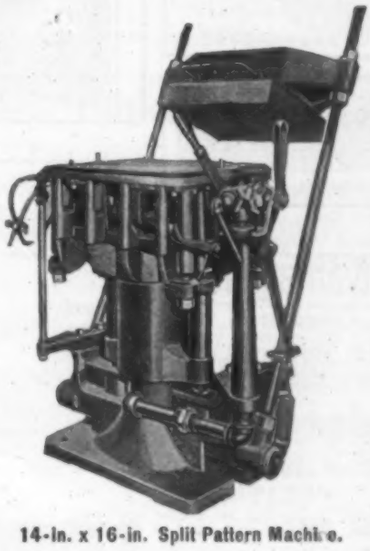
WRITE FOR PARTICULARS.

SOLE MAKERS

The William Cramp & Sons' Ship and Engine Building Company.

PHILADELPHIA, PA.

Molding Machines



14-in. x 16-in. Split Pattern Machine.

LOWEST POSSIBLE PATTERN COST.

✠

SUITED TO ALL CONDITIONS.

✠

1. Gated Work, no Change in Patterns.
2. Vibratory Machines, no Stripping Plates.

The Tabor Mfg. Co.

18th and Hamilton Sts., PHILADELPHIA, PA.

James Hartley & Co., of Manchester, Ltd., Manchester, England. Schuchardt & Schutte, Berlin, Brussels, Vienna, etc.

OTIS STEEL

"OTIS" FIRE BOX PLATES A SPECIALTY.
Flange Plates, Ship Plates, Tank Plates,
Steel Car Axles and Forgings of all Kinds.

Steel Castings from 100 to 75,000 lbs.

Head Office and Works, CLEVELAND, OHIO.
Agencies: NEW YORK, 97 Cedar St.
ST. LOUIS, 615 N. Fourth St. WASHINGTON, Kellogg Bldg.
MONTREAL, Homer Taylor, 183 St. James St.
SAN FRANCISCO, John Woodlock, 154-156 First St.

Kier Fire Brick Co.

Brands: SALINA, S. C., ETNA.
Works at SALINA, PA.

Manufacturers of FIRE BRICK.
Phone 1131. Established 1845.
Office Rooms 27-28 Stevenson Bldg., 341 Sixth Avenue. Pittsburg, Pa.

BE WISE

We are today making patterns for concerns which are most ably and shrewdly managed.
Many of the so-called "Trusts" find it economical to have their patterns made by us.
Keep down expenses—
Don't be buncoed—

THE COBEILLE PATTERN CO.,
Cleveland, Ohio.

THE PORTSMOUTH & KENTUCKY FIRE BRICK CO. PORTSMOUTH OHIO
HIGH GRADE FIRE BRICK
BEST BLAST FURNACE & STEELWORKS BRICK

THE "CLEARFIELD" FIRE BRICK

MANUFACTURED BY
The Clearfield Fire Brick Co., Limited,
Office and Works at CLEARFIELD, PA.
Room 418 Ferguson Bldg., PITTSBURG, PA., John Richardson, Agent

---

"Royal Star" & "Scioto Star"
High Grade FIRE BRICK.

Best for Rolling Mills, Blast Furnaces, Foundries, etc. High grade Plastic and Flint Clays for all refractory purposes at favorable prices.

The Scioto STAR Fire Brick Works, Portsmouth, Ohio.
Send for Catalogue.
Established 1871. Incorporated 1876.

MILLETT'S PATENT
Portable Core Oven.
All complete and ready to put the fire in.
No one who makes small cores can afford to be without it.
DOUBLE DOORS,
One closing the oven when the other is open.
SAVES FUEL. SAVES TIME.
Send for Circular.
Millet Core Oven Co., Brightwood, Mass.
The ovens can be seen in the sample rooms of the S. Obermayer Co., either in Cincinnati or Chicago, and in the show rooms of J. W. Paxson & Co., Philadelphia. English Agents, J. W. Jackman & Co., 39 Victoria St., London, S. W.

Mark your tools with a Steel Stamp
F. A. SACKMANN
34 PROSPECT ST.
CLEVELAND, OHIO.
Send for Price-list No. 12.

JOS. SOISSON FIRE BRICK CO., MAIN OFFICE CONNELLSVILLE, PA.
MANUFACTURERS OF HIGH GRADE FIRE AND SILICA BRICK FOR ALL PURPOSES. COKE OVEN BRICK A SPECIALTY.

Cleveland Union Station.
Pennsylvania Lines
Foot of Bank Street.
TICKET OFFICES at Union Station, Euclid Av. and Woodland Av. Stations.
New City Ticket Office, No. 1 Euclid Av., Cor. Public Sq.
THROUGH TRAINS RUN AS FOLLOWS BY CENTRAL TIME
*Daily. †Daily except Sunday.

* Daily. † Daily except Sunday.

From Cleveland to	Leave.	Arrive.
Pittsburg & Bellaire	†7:00 a m	†11:20 a m
Salem & Pittsburg	*8:00 a m	*8:30 p m
Salem & Pittsburg	*4:00 p m	*11:30 a m
Philadelphia & New York	*4:00 p m	*11:30 a m
Baltimore & Washington	*4:00 p m	*11:30 a m
Pitts., Bellaire, & East	†1:40 p m	†6:30 p m
Baltimore & Washington	†1:40 p m	†6:30 p m
Ravenna & Alliance	*5:00 p m	*8:10 a m
Philadelphia & New York	*11:30 p m	*5:00 a m
Baltimore & Washington	*11:30 p m	*5:00 a m
Pittburg & Wellsville	*1:30 p m	*5:00 a m

Mt. Vernon & Pan-Handle Route

From Cleveland to	Leave.	Arrive.
Akron, Columbus, & Cin.	*8:10 a m	*5:40 p m
Indianapolis & St Louis	*8:10 a m	*5:50 p m
Millersburg & Columbus	†1:20 p m	†1:05 p m
Col., Cin., Ind., & St. Louis	*7:20 p m	*7:30 a m

FOR TESTING IRON ORE BODIES
or drilling deep test holes in ANY formation—gravel, boulders and rock. Drives 4, 6, 8 or 10-inch pipe, and drills holes that size in rock, and **Produces at the Surface Everything Found.**
Tests for gold, lead, zinc, coal—everything. Can be used on boat, to explore river beds to bed rock. Water no hindrance. Drills water and oil wells quickly, cheaply and without skilled labor. Self-moving; complete. Write for full information and catalogue.
THE KEYSTONE DRILLER CO., Beaver Falls, Pa., U. S. A.

The "ORIGINAL GANDY"
STITCHED COTTON DUCK BELTING.
Especially adapted for Main Drivers, Saw Mills, Cotton Gins, Cotton Presses, and for all places where belts are subjected to moisture or atmospheric changes, the "GANDY" stands paramount.
For further information, prices, etc., write
THE GANDY BELTING CO., Baltimore, Md.

M. A. Hanna & Co.,

Iron Ore, Pig Iron and Coal.

CLEVELAND, OHIO.

CLINTON
INSPECTED FOUNDRY PIG IRON
SOFTNESS
STRENGTH
FLUIDITY
UNIFORMITY

CLINTON IRON & STEEL CO.
FURNACES AND GENERAL OFFICES, PITTSBURG, PA.
NEW YORK OFFICES, 111 CORTLAND STREET.

ORIGINATED AND MADE ONLY BY
HECTOR
INSPECTED FOUNDRY PIG IRON

TOD, STAMBAUGH & CO.
IRON ORES.
206 Perry-Payne Building, - - CLEVELAND, O.

AMYVILLE-YOUGHIOGHENY GAS COAL CO.
Operating the Celebrated "Amyville" Mines on Youghiogheny River, B. & O. R. R. and the "Katie" Mines at Bridgeville on P. C. C. & St. L. Ry. (Pan Handle).
PITTSBURG & YOUGHIOGHENY GAS, STEAM & DOMESTIC COAL.
General Offices: Iron Exchange Bldg. - PITTSBURG, PA.

PIG IRON. Red River Iron Co.'s High Silicon Pig.
HICKMAN, WILLIAMS & CO., Exclusive Agents.
The Rookery, CHICAGO. Tel. Harrison 1113.
American National Bank Bldg., LOUISVILLE.

CABEEN & CO.,
Real Estate Trust Building, PHILADELPHIA.
STEEL BILLETS AND SLABS, BOTH BESSEMER AND OPEN HEARTH, PIG IRON, MANUFACTURED STEEL, &c.

Pickands, Brown & Co.,
PIG IRON, IRON ORE AND FRICK COKE.
CHICAGO.

CRERAR, CLINCH & CO.,
The Rookery, CHICAGO.
Pig Iron, Iron Ore, Coal and Coke.

Drake, Bartow & Co.,
IRON ORE and PIG IRON.
515-516 Perry-Payne Bldg., CLEVELAND, O.

J. K. DIMMICK & CO.
Pig Iron, Steel and Coke.
DREXEL BLDG. PHILADELPHIA, PA.

OGLEBAY, NORTON & CO., Lake Superior Iron Ores.
AGENTS
THE SPANISH-AMERICAN IRON CO., Santiago, Cuba.
CLEVELAND. - - - PHILADELPHIA.

McKEEFREY & CO.,
Pig Iron, Coal & Coke.
LEETONIA, OHIO.

Pickands, Mather & Co.,
IRON ORE,
PIG IRON AND COAL.
CLEVELAND, OHIO.

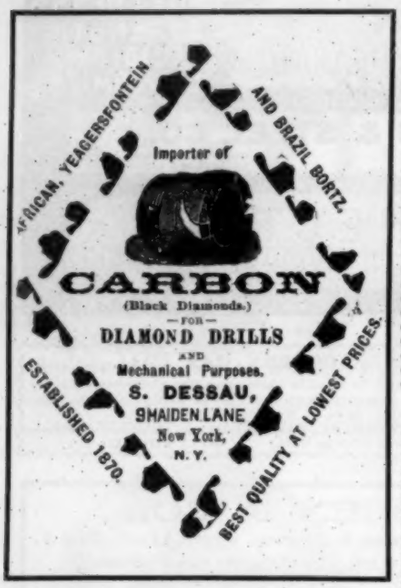
We make PIG IRON.
Foundry, Malleable, Bessemer.
LET US QUOTE YOU PRICES.
The Columbus Iron & Steel Co.,
COLUMBUS, OHIO.

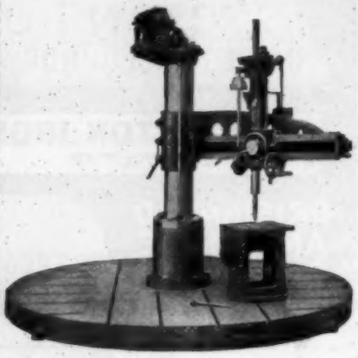
JEROME KEELEY & CO.
Established 1869.
421 Chestnut Street, Philadelphia.
Pig Iron, Iron Ores and Coke.
Consulting Engineers in Metallurgy and Mining. Steel and Iron Blooms, Muck Bars, &c.

LAKE SUPERIOR CONSOLIDATED IRON MINES.
High Grade Missabe Ores.
Adams, Ainslie, Duluth, Hibbing, Hartley, Linwood and Pillsbury Mines.
OGLEBAY, NORTON & CO., Sales Agents, CLEVELAND, OHIO.

Alabama Consolidated Coal & Iron Co.,
BIRMINGHAM, ALA.
Manufacturers of the Celebrated Brands of Foundry Iron:
CLIFTON and ETOWAH.
This iron is specially adapted to thin, strong castings.
ALSO
Miners and Shippers of HIGH GRADE STEAM COAL
AND
Makers of the Well-known "STANDARD" FOUNDRY COKE.
Selling Agents for the North and West.
MATTHEW ADDY & CO., Cincinnati, Chicago, St. Louis, Pittsburg, Philadelphia, New York.
MOBILE COAL CO., Agents for Coal and Coke in Mobile territory.

PIG IRON.
SPEARMAN IRON COMPANY, Sharpsville, Pa.
Inspected Foundry Irons.
Softness, Strength, Fluidity, Uniformity.
AMERICAN SCOTCH BRAND UNEQUALED.
HENDERSON & TRAGO, Agents, Cleveland, O.





Hitch a Motor on

to any **Bickford Radial** and you've got an ideal electrically driven Radial Drill. With all belts out of the way, that round column lets the arm swing anywhere in the entire circle, and you begin to see why it not only pays to drive by electricity, but pays to choose the tool with a view to convenience and time-saving.

RED BOOK FREE.

THE BICKFORD DRILL and TOOL CO., Cincinnati, O., U. S. A.

S. FIX SONS'
Steam Tube Welding Works.
Manufacturers of reworked boiler tubes. Good second-hand tubes bought.
Cor. Leonard and Winter Sts., Cleveland, O.

Did You Ever See a Copy of
THE FOUNDRY
the only foundry journal published? SEND FOR ONE FREE.
The FOUNDRY, Cleveland, O.

Machines for Working Sheet Metal

Patent Gap Shears.

General Purpose Punch and Shear—seven sizes.
General Purpose Forming Rolls—all sizes.
Tools for Boiler Shops, Machine Shops and general Iron manufacturing industries.
Address
BERTSCH & CO., Cambridge City, Ind.

NATIONAL TUBE COMPANY

Manufacturers of

BLACK and GALVANIZED
Wrought Merchant Pipe, all kinds: sizes 1-8-inch to 30-inch, fitted in any manner desired.

BOILER TUBES,
Mild Steel and Charcoal Iron, for Stationary, Locomotive and Marine Work.

CASING, TUBING
and Drive Pipe for Well Purposes.

GAS AND OIL LINE PIPE.

CYLINDERS,
Lap-Welded and Seamless, tested from 100 to 3,700 lbs., for Compressed Air, Carbonic Acid Gas, Anhydrous Ammonia, etc., etc., etc.

WATER and GAS MAINS,
Converse and Matheson Lead Joint Pipe, 2-inch to 80-inch.

SEAMLESS
Tubes, Shrapnell, Projectiles and Miscellaneous Forgings.

GENERAL OFFICES:
Conestoga Building, Pittsburg, Pa.

LOCAL SALES OFFICES:
Havemeyer Building, New York.
95 Milk Street, Boston.
267 So. 4th Street, Philadelphia.
Empire Building, Pittsburg.
Western Union Building, Chicago.
420 California St., San Francisco, Cal.

FOREIGN OFFICES:
Dock House, Billiter Street, London, E. C., Eng.
TELEGRAPHIC ADDRESS—TUBULIFORM, LONDON.